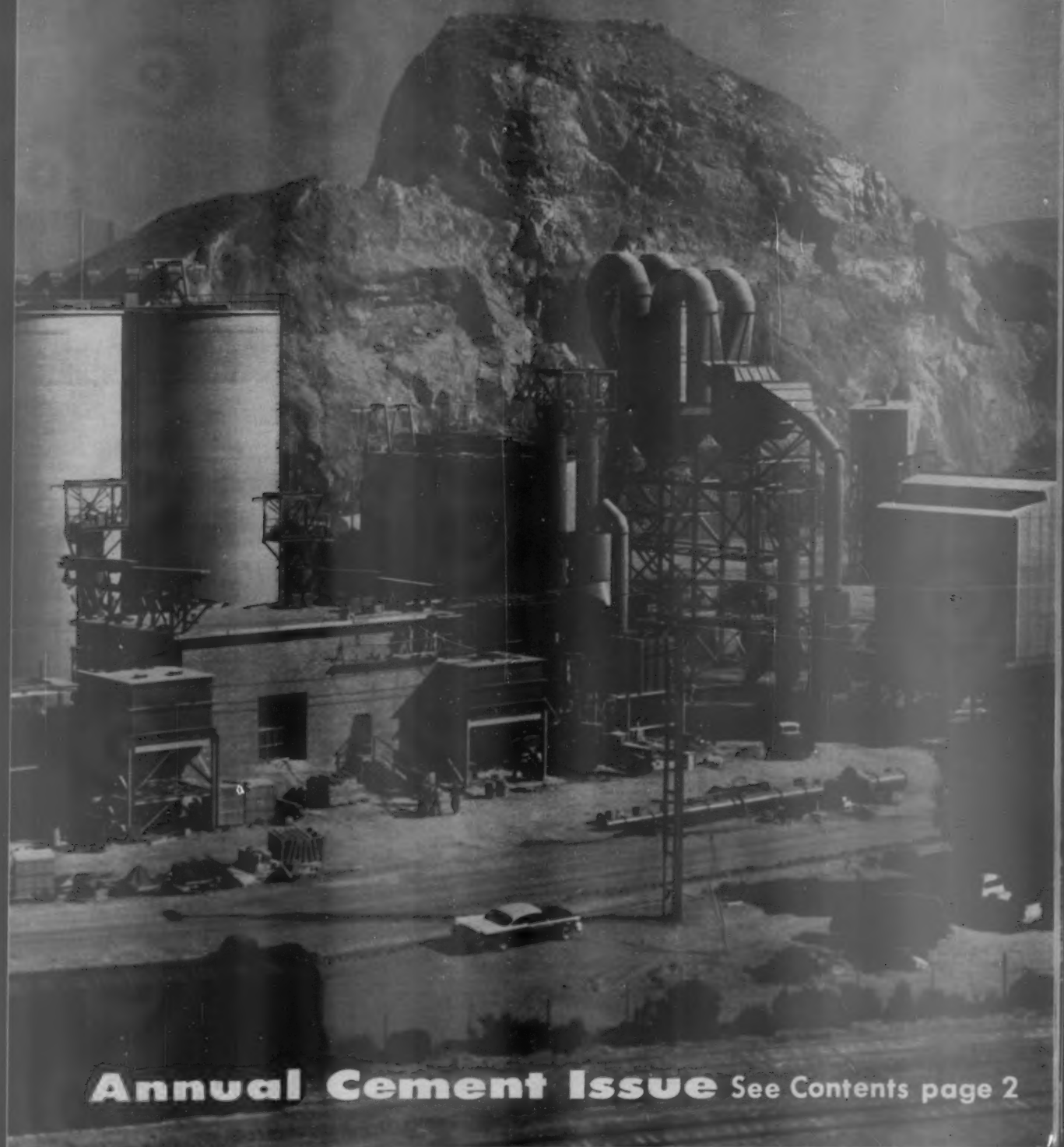
MAY 1961

ROCK PRODUCTS



Annual Cement Issue See Contents page 2

More efficient CRUSHING AT LOWEST COST for labor, power and upkeep with WILLIAMS REVERSIBLE IMPACTOR

REVERSIBLE ROTATION prolongs parts life without manual adjustment. A simple reversing switch on motor does it.

INTERIOR VIEW of small Impactor shows typical rugged hammers, impact blocks and liners made of manganese steel and other alloys. Rotor removable without disturbing feed or other mechanisms.

For secondary crushing, the economy and high production of a Williams Reversible Impactor is unequalled, whether raw material is hard and abrasive or soft and friable. Precision control of specified top-size is easy, usually in a closed circuit system, from a coarse 2" with minimum fines, down to 35 mesh or finer.

The Impactor has no grates. Material fed into the mill is reduced to proper size while rebounding between the whirling hammers and impact blocks, until discharged from bottom opening. Grinding or rubbing action is eliminated—power, replacement parts and downtime are reduced to a minimum. No fine adjustments need be maintained.

Reversible rotation is a prime feature of the Williams. So is *Wide Open Accessibility* to interior. So are the *Interchangeable Impact Blocks* to balance wear. So are the many other exclusives that hold cost-per-ton to the very lowest. There is a size and model for your exact needs. *Write for catalog.*

WILLIAMS PATENT CRUSHER AND PULVERIZER CO.
800 St. Louis Ave. • St. Louis 6, Mo.

Hammer Mills | Helix-Seal Mills | Roller Mills | Air Separators | Vibrating Screens | Feeders

WILLIAMS
CRUSHERS GRINDERS SHREDDERS
Oldest and largest manufacturers of hammer mills in the world

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NEW Link-Belt bucket elevator chain developed

for high elevators handling abrasive materials

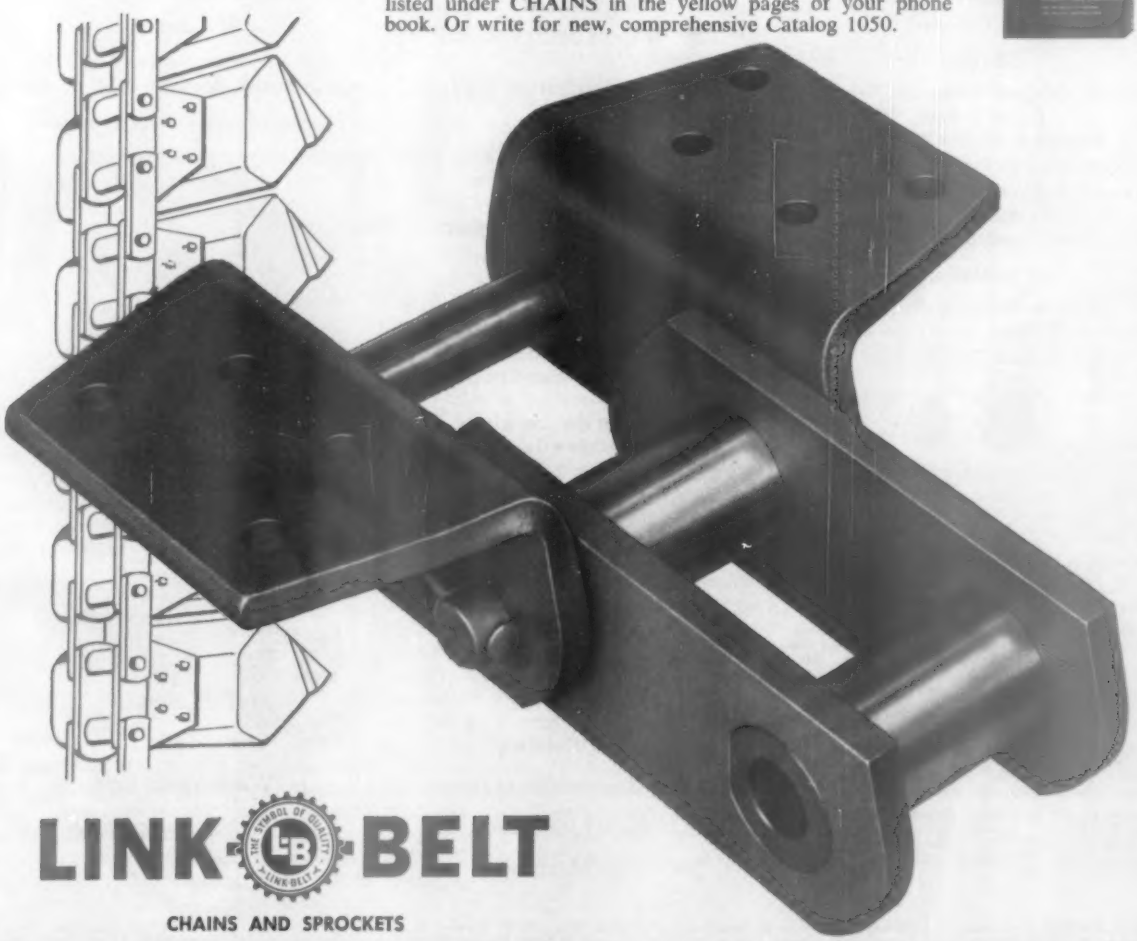
Elevators in cement mills and similar installations handling abrasive materials benefit from the long service life of these durable SS Class bushed chains

SS-2857: 6″ pitch; 130,000# chain
SS-2859: 6″ pitch; 200,000# chain
SS-2864: 7″ pitch; 200,000# chain

The punishing effects of heavy loads and severe abrasives are easily absorbed by the three new Link-Belt elevator chains listed at the left. The chains are capable of uninterrupted service day-in and day-out—even on high, heavily loaded elevators—because of their balanced design and high strength.

Hardened steel sidebars are machined for accurate, uniform pitch. Alloy steel pins are specially heat-treated to combine toughness and wear resistance without sacrifice of shear strength. Alloy steel bushings are case-hardened to resist wear and sprocket impact.

For full details on these rugged elevator chains, or other Link-Belt SS Class chains for lighter service, call your nearest Link-Belt office or authorized stock-carrying distributor, listed under CHAINS in the yellow pages of your phone book. Or write for new, comprehensive Catalog 1050.



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May 1961

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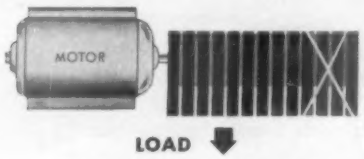
B.F.Goodrich V belt briefs

TIPS ON THE CARE, MAINTENANCE AND SELECTION OF V BELTS FOR INDUSTRY

BFG V belts have 40% greater horsepower rating, cost no more

All B.F.Goodrich V belts now have 40% greater horsepower rating. This higher capacity rating was formerly found only in high capacity belts, but now costs *no more than former standard belts.* This means that lighter, more compact, and lower cost drives can now be used, because these B.F.Goodrich belts carry the horsepower needed for efficient drives using fewer belts at standard belt prices.



9 V belts can now do work of 13.

What caused these failures?

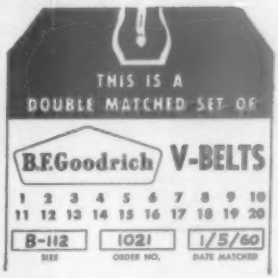
Answer: Prematurely worn sides are caused by grit, dirt or any such abrasive contact. Misalignment often causes wear on one side only. To prevent, align the sheaves, checking with straightedge or cord. Keep belts and sheave grooves clean.

Answer: Belt put on improperly, or foreign objects fell into groove to rupture cover fabric. To prevent, move motor toward driven sheave when replacing belt. If rupture was caused by foreign object, protect belts with a cover.

BFG double matching program keeps V belts matched during the life of the drive

Double-matching assures you that a set of B.F.Goodrich V belts are of equal length when installed and will stay uniform in length for the life of the belts. When V belts of different lengths are put on the same drive, longer belts loaf, while shorter ones carry all the load and fail quickly. B.F.Goodrich double-matched belts are measured *twice* for uniform length, once when manufactured and again after storage. Only belts that are of equal length when manufactured and after storage are grouped into sets.

Belts that are grouped into sets are tied together with a tag which gives the date when belts were matched. Belts which have been in storage over a year and "tag ends" are returned to BFG for replacement to make sure that your distributor always has a fresh stock of double-matched belts.



Here's the tag which goes on each set of double-matched belts, giving exact date belts were matched.

How to protect against static electricity in V belt drive

Static electricity is developed on every V belt drive. If there is an explosive atmosphere under certain conditions it can trigger an explosion.

Various means are used to get rid of this static charge. The most reliable method is in the use of static conducting V belts which are grounded to both the motor and the driven unit.

But unless the motor and the driven unit are properly grounded there can be no protection regardless of the type of static conducting V belt used.

Static conductivity in a V belt is made possible by special compounds used in the cover. Because cover wear reduces the belts' ability to conduct static, drives should be inspected frequently. Any belts showing cover wear should be replaced immediately. With any set of V belts, it is good practice to replace the entire set.

When ordering BFG Multi V belts, "static conducting" belts must be specified and cost slightly more. All BFG Maxipower V belts are static conducting and heat and oil-resistant at no extra cost.

The Question Corner—

Grommet construction is exclusive in B.F.Goodrich V belts. Grommets are two extra strong cord loops, inside the belts, like twisted cables, except they are endless. Unlike ordinary belts, there are no center cords in the Grommet belt, so it is more flexible, can "give" temporarily and absorb shock loads.

Let your B.F.Goodrich distributor show you how this higher capacity, longer belt life, ability to stand hard use, can reduce your V belt costs per year and make other savings in operating and maintenance costs.

Ask a factory-trained specialist

For help in selecting V belts for any kind of service, call the man who is a specialist in V belts—your B.F.Goodrich distributor. He can help you cut costs by getting longer life from your V belt drives. *B.F.Goodrich Industrial Products Company, Dept. M-110, Akron 18, Ohio.*

B.F.Goodrich V belts

THINK BIG

Bigger and better than its predecessors, the QM-5 is designed to make Swiss cheese of granite and to drill holes up to 9" bore size at a rate that will give a production of up to 457 tons per hour with lowest bit cost per unit of production.

New features include angle drilling to 25 degrees, a maintenance-free ejector type dust collector, enclosed operator's cab and full working platforms. Also, choice of famous DHD-500 and DHD-400 Downhole drills for hole sizes from 7½ to 9 inches. Air power is supplied by two Gyro-Flo 900 rotary compressors available in diesel or electric drive.

Ask your Ingersoll-Rand sales engineer for the full Quarrymaster story.

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Enter 1070 on Reader Card

NEW and OLD
They're TOUGH RIGS!

5-6-20-S

THIS VETERAN and a youngster—two Northwest Model 6 shovels, the newer one in the foreground, swing out 50,000 tons of rock a month. The job is one of Campbell Limestone Company's at the Pelham Pits in South Carolina. But the rock isn't limestone. It is granite! The old Model 6 holds its own and perhaps it is this kind of performance of Northwest rigs that has been responsible for the fact that Campbell Limestone Company now owns its 12th Northwest.

New or old, they are tough rigs! Machinery Bases of alloy cast steel with cast steel Machinery Side Frames—massive—capable of amply withstanding the wracking, twisting strains of rock digging — a base that frees you from periodic rebuilding.

Get on a Northwest! Feel that crowd take ahold. Find out what it means to watch that dipper bite up through in one smooth cut. Here is a combination—the Feather-Touch Clutch Control that brings ease of operation with the Northwest Dual Independent Crowd—a combination that brings a smoothness of maneuverability in handling the dipper the like of which you have never experienced before.

The Northwest Dual Independent Crowd utilizes force most independent crowd shovels waste. The Cushion Clutch eliminates shock overloads on operating machinery, Northwest design assures easier upkeep. These are just part of the many advantages that Northwest brings you for high output in rock work. They combine to make the Northwest the finest machine of its kind.

NORTHWEST ENGINEERING COMPANY
1514 Field Bldg. • Chicago 3, Illinois

NORTHWEST

NORTHWEST EQUIPMENT IS BUILT IN THE FOLLOWING SIZES

SHOVELS	CRANES	DRAGLINES
¾ Yd. to 2½ Yd. Capacity	13-Ton to 60-Ton Capacity	¾ Yd. to 3 Yd. Capacity

PULLSHOVELS	TRUCK CRANES
¾ Yd. to 2½ Yd. Capacity	25-Ton and 45-Ton Capacity

3/4 to 3
Cubic Yard Capacity

The newest reason to make your next tandem a FORD:

'61 FORD HEAVY DUTIES

GIVE TWICE THE CAB, FENDER AND RADIATOR LIFE!

Rugged Ford Heavy Duties utilize heavier gauge steel, sturdier reinforcements, and a new independent mounting system to separate cab, fenders and radiator. This stronger construction, with each component *individually* frame-supported, doubles cab, fender and radiator life—cuts downtime delays and maintenance expense.

CAB—A 25% heavier floor pan and toeboard provide a solid base for greater cab durability. New full-length door pillar reinforcements and stronger inner door panels minimize door sag. New triangular mounts keep cab level and protect it from frame-movement stresses.

FENDERS—Ford fenders are 25% heavier gauge, too. They are bolted to a rubber-cushioned transverse support in front for needed flexibility. Fender-wide rear brackets provide necessary rigidity. The removal of only 8 bolts permits pulling the fender for rapid access to engine.

RADIATOR—New Ford "lock-seam" construction doubles the solder area on key seams, and heavier gauge tank and header walls provide increased radiator strength. "Horse collar" mounting on rubber pads soaks up vibrations and diagonal braces at sides give solid support.

Ford's separate mounting of cab, fenders and radiator frees them from frame-movement stresses that occur when these parts are rigidly attached to each other. Result: failures and service costs are reduced even in tough off-road operation.

Ford T-Series tandem rear axle trucks and tractors are available with GVW's up to 51,000 lb.—GCW's up to 75,000 lb. Your choice of Timken or Eaton axles with up to 38,000 lb. tandem capacity. Seven exclusive-truck V-8 engines range from 302 to 534 cubic inch displacement.

SEVEN MORE REASONS WHY IT'S GOOD BUSINESS TO DO BUSINESS WITH FORD!

You save from the start with Ford's traditionally low prices, and your savings continue with low operating and maintenance costs. These facts are documented by certified test reports from America's foremost independent automotive research firm. Ask to see these reports. They're on file at your Ford Dealer's.

In addition to these dollar-and-cents savings, the following bonus benefits are yours with Ford Trucks:

1. **Rigid quality controls** give you the strongest safeguard of truck reliability ever. Modern, *exclusive-truck* manufacturing facilities, with emphasis on quality every step of the way, are designed to give you a Ford Truck that is as free from defects as a truck can be. Tangible results of these high standards are Ford's new warranties.

2. **Exclusive 100,000-mile warranty** (or 24 months) on 401-, 477- and 534-cu. in. Super Duty V-8's is the most liberal in the industry. Each major engine part (including block, heads, crankshaft, valves, pistons, rings), when engine is used in normal service, is warranted by your dealer against defects in material or workmanship for 100,000 miles or 24 months, whichever comes first. The warranty covers full cost of replacement parts . . . full labor costs for first year or 50,000 miles, sliding percentage scale thereafter.

3. **12,000-mile warranty** (or 12 months) on all 1961 Ford Trucks of every size is further evidence of the confidence Ford has in its quality controls. Each part, except tires and tubes, is now warranted by your dealer against defects in material or workmanship for 12 months or 12,000 miles, whichever comes first. The warranty does not apply, of course, to normal maintenance service or to the replacement in normal maintenance of parts such as filters, spark plugs and ignition points.

4. **Special fleet financing** can be arranged by your Ford Dealer. It's available for owners of two or more trucks, and provides the opportunity to precisely tailor payments to your income patterns or depreciation schedules. This fleet-fitted financing offers substantial savings and frees your working capital.

5. **Sales engineers and service specialists** in 36 district offices are on call to solve special truck problems. Working with both dealers and customers, these experienced truck men represent another extra step Ford takes to provide your continued satisfaction.

6. **Replacement parts depots** at 26 strategic locations across the country quickly supply needed parts from ample stocks. Ford's entire supply system is geared to give you faster service and reduce costly downtime . . . *wherever* you are.

7. **6,800 Ford Dealers,** including 280 specialized Heavy Duty truck dealers, can keep your trucks ready to go wherever they go. From coast to coast, fast Ford service—gas *and* Diesel—is always close at hand.

From Super Economy pickups to Diesel-powered tractors, you can now fill every truck need up to 76,800 pounds GCW with a modern, money-saving Ford Truck.

Quality-Built...Maintenance-Engineered

FORD TRUCKS COST LESS

FORD DIVISION, *Ford Motor Company*

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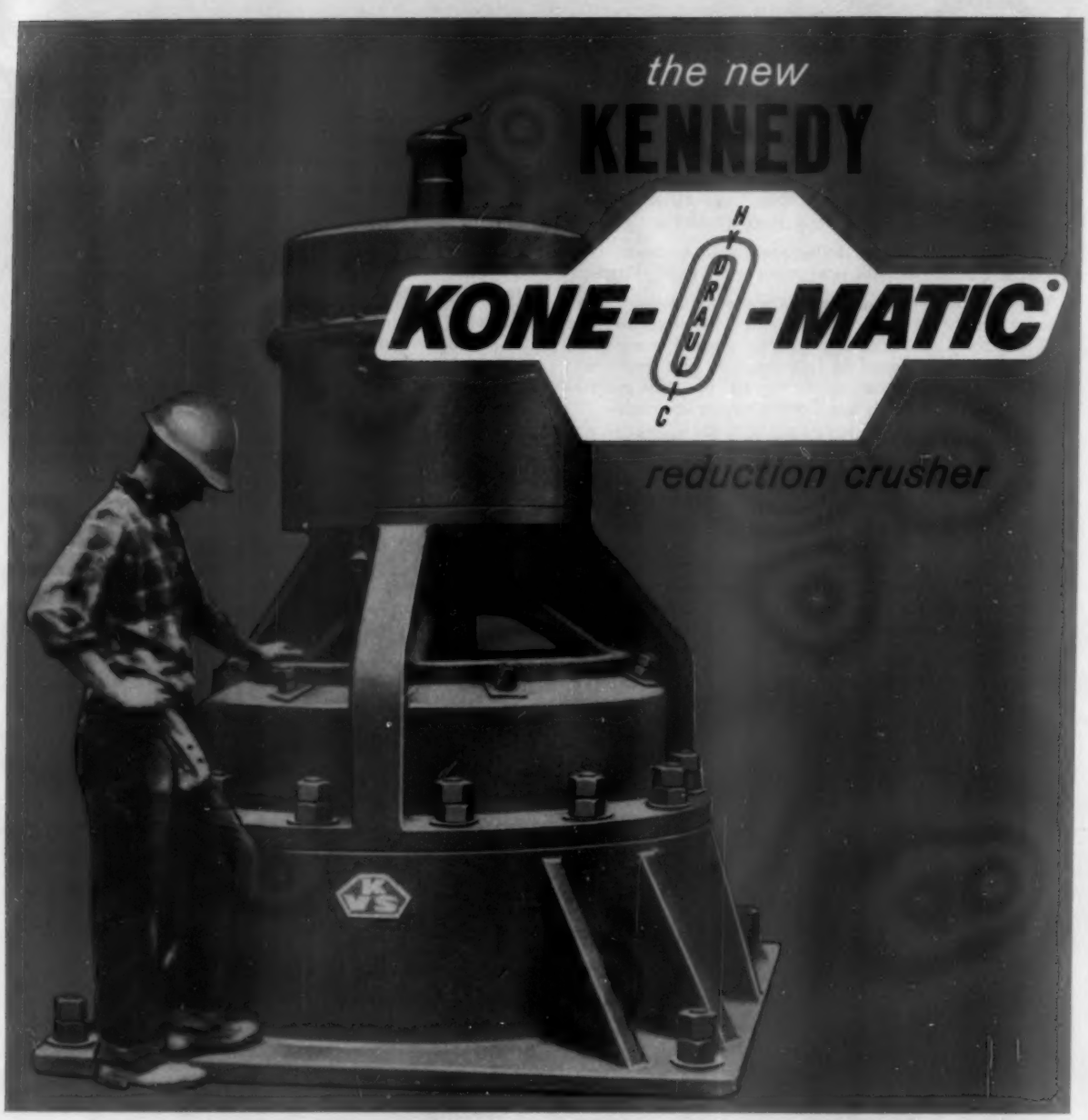

- **With the *KONE-O-MATIC* Crusher, setting is sensed and held in position automatically by a multi-piston, fully hydraulic suspension system!**
- **Tramp iron is automatically released and *KONE-O-MATIC* is back to its setting *fast*, with no strain, shock, bump or damage!**
- **Setting can be changed instantaneously by finger-tip control without shutdown!**
- **And the new *KONE-O-MATIC's* feed opening is lower and larger, size for size, than any other crusher we know of!**

These, and many other exclusive features, add up to more productive hours per year, and therefore, more output; to fewer operating headaches; to a more evenly sized product; and best of all, you'll save on overall operating cost! This has been proven in actual quarry operations! We know you'll like the *KONE-O-MATIC!*

Send today for the new KENNEDY KONE-O-MATIC Bulletin, KOM-61.

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- HEAT TRANSFER
- FIRING EFFICIENCY
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- REFRACTORY REQUIREMENTS
- AUXILIARIES & CONTROLS

IBM 650 Data Processing System used by KENNEDY Engineers for Rotary Kiln Calculations.

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- Cement, wet or dry process
- Ore nodulizing
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Enter 1003 on Reader Card

PORTABLE CONVEYOR, CAR UNLOADER STOCKPILE AT 210 TPH FOR ICBM BASE CONSTRUCTION

Barber-Greene conveyor system at ready-mix plant increases capacity, virtually eliminates downtime and maintenance costs for contractor

"Our Barber-Greenes have boosted plant capacity, permitted us to buy material in more economical 10-car lots, virtually eliminated downtime and maintenance costs, and helped us to meet tough specs during work on an ICBM base contract," reports Jim Olsen, superintendent of Cass Concrete Products Co.

Sand and gravel for this 16,000 cu. yd. project are brought by rail to the ready-mix plant, located about mid-way between Omaha and Lincoln, Nebr. The big 70-ton hopper cars are unloaded by a Barber-Greene Model 358 Unloader in about 40 minutes each, including time to position car, attach shaker, and open hopper door. Stockpiling is done by a 75′ Model PA-80 heavy-duty portable conveyor, which permits storage of up to 2,500 tons in a single circular pile.

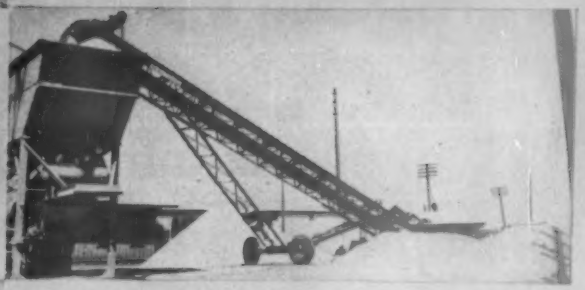
Material is reclaimed by two Barber-Greene permanent conveyors, a 40′ channel frame unit located in a tunnel under the pile and a 172′ truss-type conveyor that charges the bins in the batch tower. Gates over the tunnel conveyor permit independent reclaiming of sand, gravel, and stone.

You can get this same top performance by calling in your Barber-Greene distributor next time you have an unloading, stockpiling, or screening problem. He sells the only complete line of portable conveyors, portable screening plants, and hopper car unloaders. And each model has a world-wide reputation for efficient, dependable performance.

Barber-Greene's complete line gives you more conveyor for your money

PORTABLE SCREENING PLANTS—The all-new Model PS-70 with exclusive Vibra-Spring screen suspension that doubles shock resistance and spring life, delivers capacities to 700 tph. Single deck model tows over the highway without disassembly, needs no overhead or ground screen supports. Double deck PS-70's have quick attach screen mounting. Both are fed by interchangeable hopper or trap.

HEAVY-DUTY PORTABLE CONVEYORS—P-70 Series offers choice of torque-arm V-belt, or lineshaft drive, gasoline or electric power. Lengths range to 60' and capacities to 630 tph. Rugged construction throughout permits these units to take even the toughest punishment in stride. Accessories available for every job requirement.



CHANNEL-FRAME PORTABLES AND UNLOADERS—Channel-frame portable conveyors are available in lengths to 40' for capacities to 200 tph. Lineshaft drives require virtually no maintenance. Model 358 Car Unloader operates either above or below rails, has positive belt drive that prevents slippage, even when started under full load.

Long reach of 75' Model PA-80 Portable Conveyor allows user to build 2,500-ton radial stockpile. Other Barber-Greene portables are available in lengths up to 100' or more.

Note aggregates spewing from Model 358 Car Unloader at 3½ t.p.m. onto rugged 75' PA-80 Portable Conveyor that builds the radial stockpile.

The ultimate in precision-built portable conveyors

Representatives in Principal Cities of the World

Barber-Greene BG

Main Office and Plant AURORA, ILLINOIS, U. S. A.
Other Plants: DeKalb, Milwaukee, Detroit, Canada, England, Brazil, Australia

CONVEYORS • LOADERS • DITCHERS • ASPHALT PAVING EQUIPMENT

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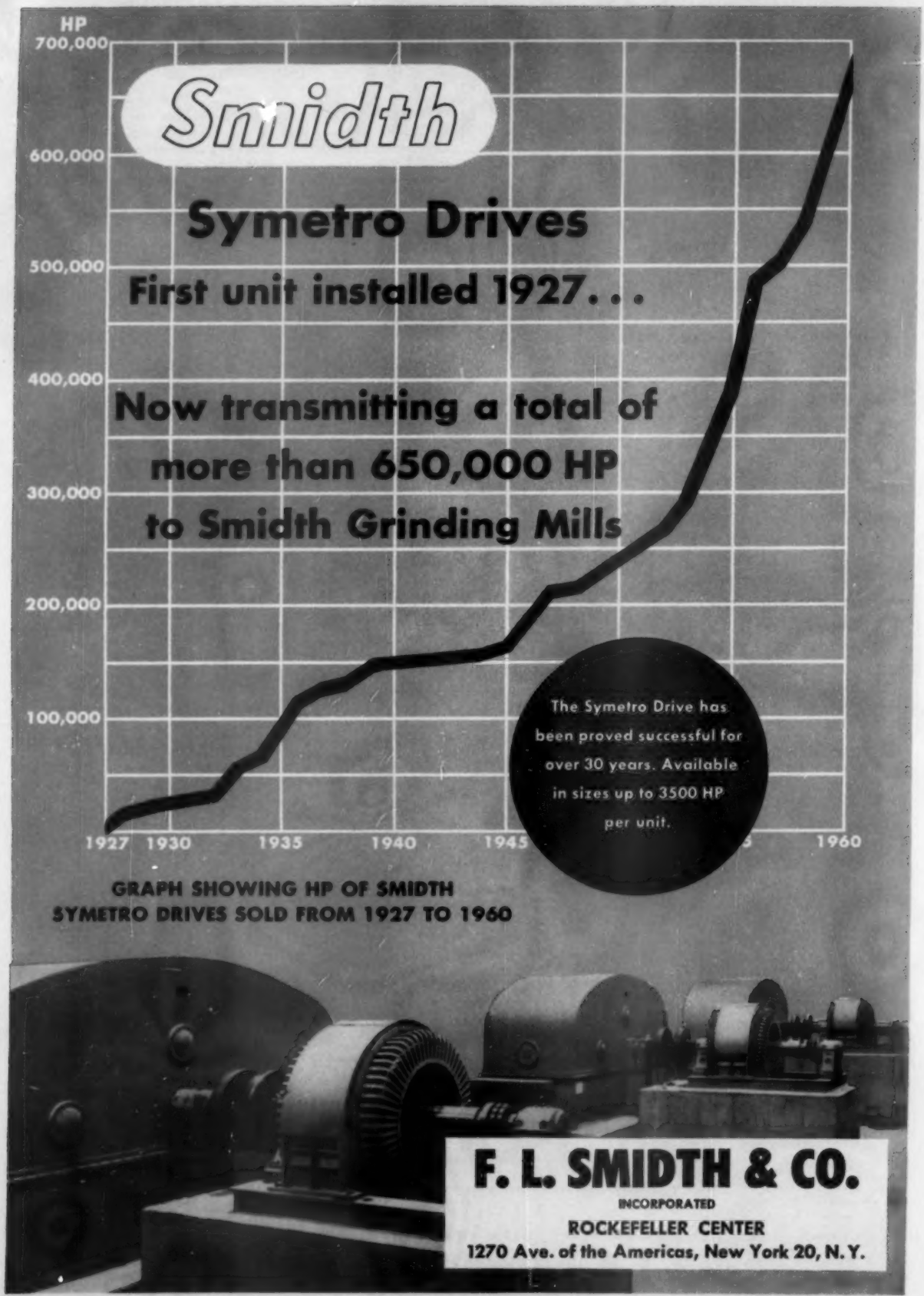

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WHAT'S HAPPENING

IN OTHER FIELDS OF INTEREST TO THE ROCK PRODUCTS INDUSTRY

The last impassible gap in the Inter-American Highway should be completed within a year. The U. S. is bearing $3.8 million of the $5.7 million estimated total cost of constructing 39 bridges of reinforced concrete and structural steel in a 133-mile stretch between San Isidro del General, Costa Rica and the Panama border. The Costa Rica Ministry of Public Works is providing the engineering services, subject to approval by the Bureau of Public Roads. The Inter-American Highway system is part of the Pan-American Highway, planned to link the capitals of the Central and South American Republics with the U. S.

Skid-resistant and extra strong—that's asphalt made with waste slag from aluminum smelting operations. Research conducted at the Transportation Institute of Texas A & M College not only provided a service to the paving industry, but found a much-needed use for many thousand tons of waste products. Aluminum slag is also being added to white cement for terrazzo-type surfacing. And recently the Institute has introduced limestone fines as a hot-mix ingredient. When the latter project began, Texas mines had 2 million tons of these by-products on their hands!

A well over two miles deep is being constructed to dispose of wastes flowing at the rate of 165 gpm. from the Rocky Mountain Arsenal near Denver. For safe removal of the nerve gas and insecticide by-products, a shaft ranging from 20 in. diam. (cased) to 13⅜ in. diam. will be sunk approximately 11,400 ft. to pre-Cambrian granite. The Omaha District Corps of Engineers, which is constructing the well, claims the following advantages for this areas's Fountain formation: it is porous and presumably absorptive sandstone; it is 1,000 ft. thick, indicating great capacity, and topped by a 3,000-ft. stratum of impermeable shale which should prevent wastes from migrating upward into useful strata; it is not tapped for water within hundreds of miles.

Now heat can be converted into electricity at 2000 deg. F., thanks to new thermoelectric materials developed by Westinghouse Electric Corp. These refractory compounds are samarium sulfur and cerium sulfur, and they are prepared by combining the pure, rare earth metals with the sulfur. The resulting sulfide is crushed, compacted into cylindrical-shaped pellets and sintered in a vacuum induction furnace. The end result—stepped-up efficiency in future thermoelectric power generators.

Those Russians have done it again! According to one report, the Soviets have overtaken Canada as asbestos producers. Annual U.S.S.R. production is now approximately 1.2 million tons, predicted to reach 2 million by 1965.

Please turn page

Increasingly heavy floods of traffic are jamming Europe's highways, many of which date back to Roman times. Roadbuilding plans of the 10 most highly motorized countries (France, West Germany, Switzerland, Britain, Italy, Holland, Denmark, Sweden, Belgium and Austria) are to provide at least 9,700 miles of superhighways spanning Western Europe by 1980. Zooming car ownership, greater than ever international truck traffic, and an uneasily rising accident toll are giving impetus to these programs. On the other hand, already overtaxed budgets, many difficult natural barriers, plus the European's traditional resistance toward destroying historical landmarks or "atmosphere" have been frequent stumbling blocks. U. S. interest in these extensive projects, besides the fact that driving tourists will have an easier time of it, is due to American heavy machinery, still considered superior to most European makes, which is widely in use. Caterpillar, Allis-Chalmers, Euclid and International Harvester are among the firms happily "cashing in" on the Old World's roadbuilding progress.

Pipelayers, pass that glue! Epoxy cement developed by Tex-Tube, Inc., Houston, Texas, is being used in southwestern gas fields to join thin-wall pipe. Installation time is substantially reduced—it takes less than 2 min. to cement the enlarged end of one length over the straight end of the next, apply an hydraulic crimping tool and tape the joint. After 48 hr., a glued joint on a 3-in. line can withstand a 1,200-psi. working pressure, and a 4-in. line will stand 800 psi. Too, epoxy-joined lines stand up longer in corrosive service than does welded pipe. The chemical industry may well be next to adopt the new method.

A ruby performs the most extraordinary feats with light for Hughes Aircraft Co. This specially grown synthetic crystal makes light frequencies "coherent" and produces a narrower, sharper, more intense beam of light than ever before possible. Unlike ordinary light rays, those re-radiated by this ruby travel in almost parallel paths; combined with the "coherence" factor, this produces a light so intense that to equal it in an ordinary light sourse would have to be heated to a degree higher than the center of the sun. The laser (named for Light Amplification by Stimulated Emission of Radiation) has an exciting range of future uses. Some being considered are: space communication; destruction or modification of individual molecules, and satellite photography.

The poisonous nitrous fumes given off in mine blasting can now be filtered through beds of vermiculite impregnated with special chemicals. This process, which results both in increased safety and heavier blasting schedules, is one of an increasing number of uses for this lightweight, fireproof, porous, absorbent mineral.

Valuable water escaping from canals, ponds and reservoirs is outfoxed by SS-13. This slimy chemical "mud" is described by manufacturer Brown Mud Co., Torrance, Calif., as "a mixture of resinous polymers and heavy atoms in a carrier of common diesel fuel." When dumped into water, it increases the attraction between soil particles and water, thereby creating a water block to seepage. The product can prove a blessing in arid climates, as the U. S. Bureau of Reclamation estimates that up to 50 percent of water diverted for irrigation is lost before reaching its destination.

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FOR DRY PROCESS CEMENT KILNS

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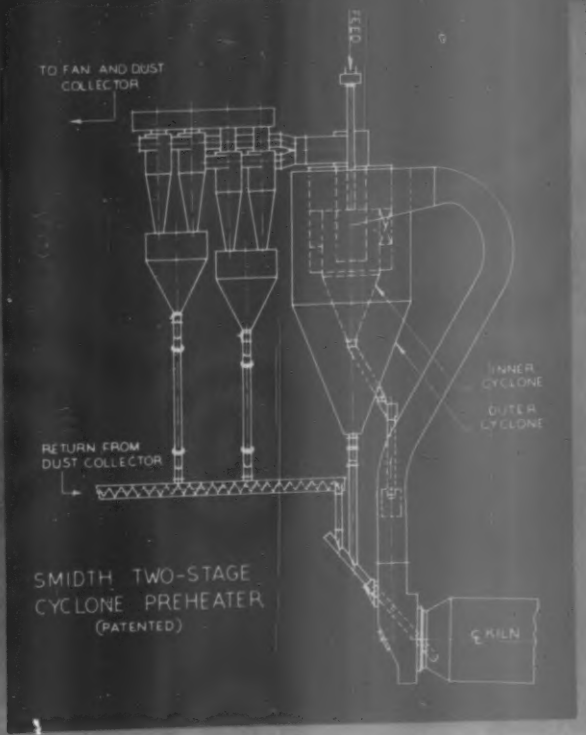

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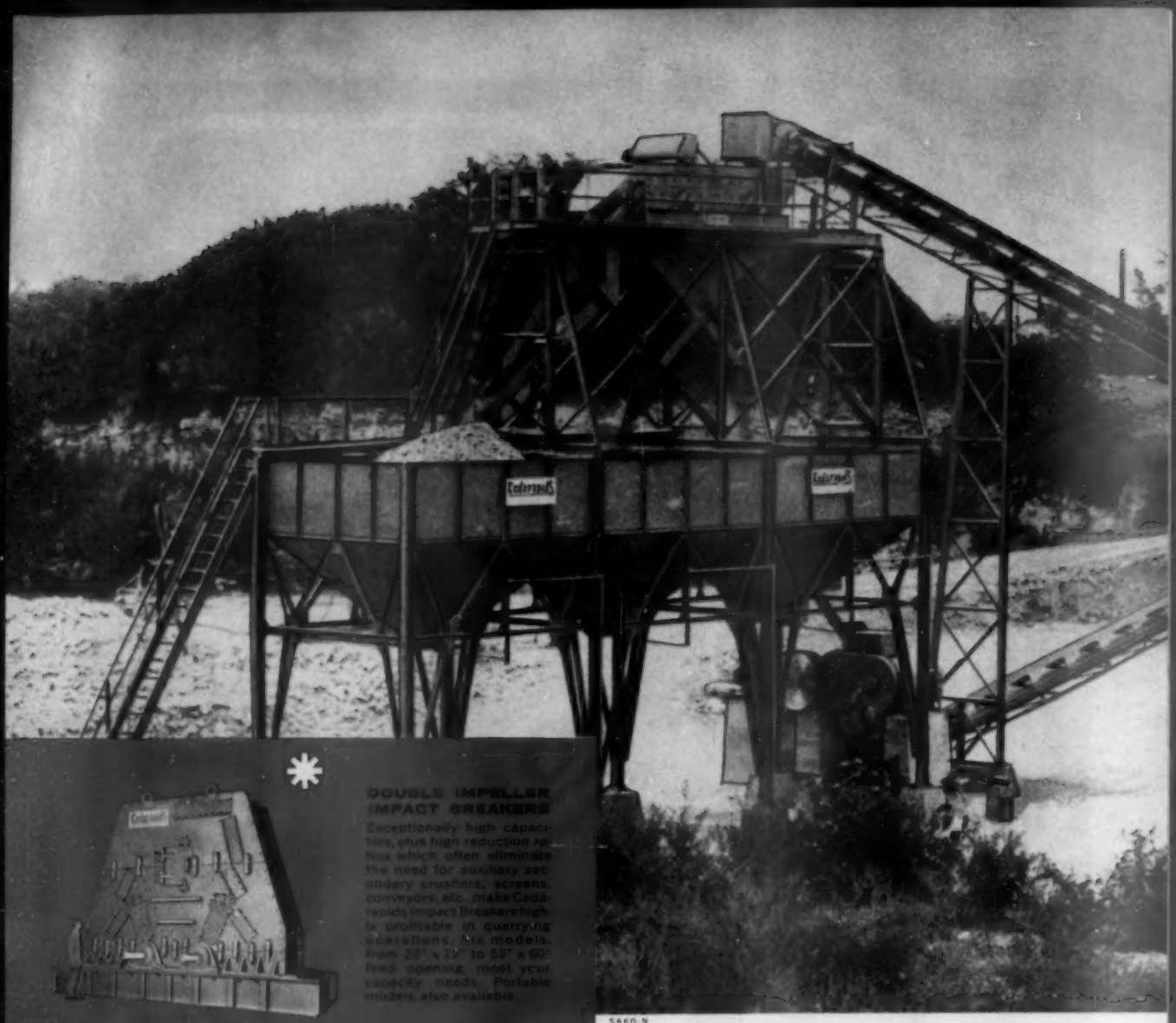

DOUBLE IMPELLER IMPACT BREAKERS

Exceptionally high capacities, plus high reduction ratios which often eliminate the need for auxiliary secondary crushers, screens, conveyors, etc., make Cedarapids Impact Breakers highly profitable in quarrying operations. Six models, from 22" x 12" to 53" x 60" feed opening, meet your capacity needs. Portable models also available.

5660-N

Production-balanced components—
CEDARAPIDS ENGINEERED FOR LOWEST COST PER TON

TWIN-JAW CRUSHERS

An exclusive Cedarapids design! Two movable synchronized jaws, operating at high speed, give you 40% to 100% greater primary crushing capacity than single-jaw crushers of comparable size. 5 to 10 times longer jaw life cuts maintenance. Available in three sizes. Single-jaw crushers also offered in 13 sizes.

ROLL CRUSHERS

Where high capacities of the crushed products are required, Cedarapids roll crushers are ideal units for secondary reduction. Six model sizes to meet volume demands and balance primary production.

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Fast, snappy action, with no soft, cushioning effect. Horizontal cloth openings permit more of the correct size material to go through, yielding 30% greater capacity than same-size inclined screens. Sizes: 3' x 8' to 60" x 16', double and triple deck.

HAMMERMILLS

Exclusive Cedarapids Hammermill features produce a much finer quality of product, and size for size, produce more tons per hour than other similar types of equipment. 4 sizes available.

Plus feeders, conveyors, vibrating grizzlies, washing plants, bins, etc.

In the face of rapidly rising operating costs and growing competition, there's one good way to get out of the slim-profit strait jacket. Call in Cedarapids Engineers to "tailor" a stationary plant to your specific needs.

Cedarapids Engineers will give you a sound evaluation of your raw material, job site and operating conditions, and your potential market. They will incorporate the newest developments in equipment and the latest technical improvements in plant engineering. You'll benefit with an *engineered* plant, cleanly designed with the minimum number of the proper type of components to give you the desired capacity of improved, specification products . . . and with the maintenance and operating economies that assure lowest cost per ton.

Your Cedarapids Dealer will show you how to take advantage of this cost saving, time saving, one-company service. Or write direct to Cedarapids Special Plants Engineering Department.

IOWA MANUFACTURING COMPANY

CEDAR RAPIDS, IOWA

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in wire rope design

7-FLEX®

PATENT APPLIED FOR

Premium Whyte Strand IWRC

There's no other wire rope like it! Macwhyte combines all desirable wire rope characteristics in a single ALL-PURPOSE rope!

We think you'll be as excited as we are about 7-FLEX! This is the kind of rope you've been hoping for. It's as flexible as an 8-strand rope—as rugged as 6 x 19—and resists fatigue like 6 x 37.

7-FLEX has 16⅔% more wearing surface than 6 strand rope. There is less unit pressure between rope and sheaves, so less rope and sheave wear. There is more sheave contact, less rope-creep. Result — longer rope life — less down time — lower operating costs!

The all-new 7-FLEX is a PREmium high-quality, high-strength PREformed and internally lubricated Macwhyte Rope.

You'll want to install this rope on equipment applications like these:

- Crowd and hoist rope on scraper wagons
- Holding and closing lines on clamshells
- Shovel and drag line hoist ropes
- Digging lines on small excavators, trench hoes, etc.
- Boom hoist lines on excavating equipment
- Hoist and swing lines on dredges and derricks

Ask any Macwhyte distributor or write for bulletin 60100-R.

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EDITORIAL

by GEORGE C. LINDSAY

What price efficiency?

THIS IS THE AGE OF SPACE, THE ATOM AND EFFICIENCY. With regard to the latter, every business tries to—or should—improve its use of capital, labor, land and management ability. The idea, of course, is to make a better product, more acceptable to the consumer at a price, while improving wages, profits and dividends. It's not easy to do, especially if the cost of doing so is considered.

Here's what the cement industry has found: the efficiency in the use of labor has increased, but the cost of getting that efficiency has risen at a faster rate.

Over-all cement industry data for the past decade will show a commendable increase in production of cement per man-hour. We don't have labor costs on that basis to compare, so let's take a specific example of one cement company to illustrate cost of labor efficiency. Production in barrels per man-hour increased in the 1951-1960 period by an average of 3.1 percent per year, for that company. During the same period—and this is important—the production in barrels per dollar of labor cost decreased an average of 2.7 percent per year. How can this be, you say, in an industry that is counted among the successful?

This is where the cement industry has been competent in the use of economic gymnastics. It has applied its efforts also toward the improvement of efficiency in its use of capital and management ability. You see, there is more than one type of efficiency.

The above company, during five of the 1951-1960 years, invested an average of about $10 million per year to do the economic job it had to do. By so doing, it improved its earnings per employe an average of 4.6 percent per year. This helped to overcome the inefficiency it experienced in the cost of labor productivity.

A check of a small group of cement companies showed this revealing fact: in the 1956-1960 period, the companies made capital investments of $1.50 per employe per year for every $1 per employe in annual earnings.

But here's the big question for the cement industry, which is facing another period of expensive expansion to supply a growing market: How long can it perform wonders with economic slide rules to compensate for the growing cost of increased labor efficiency?

The price of every type of efficiency increase promises to be the big cement problem of the 1960's.

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147 COMBINATIONS . . . horizontal or vertical applications . . . .

UNIT SIZE	SHAFT MOUNTED DRIVES					
	RATIOS			MOTOR MOUNT	OVERLOAD RELEASE	BACK-STOP
	4	14	24*			
107J	X	X	X	X	X	X
115J	X	X	X	X	X	X
203J	X	X	X	X	X	X
207J	X	X	X	X	X	X
215J	X	X	X	X	X	X
307J	X	X	X	X	X	X
315J	X	X	X	X	X	X
407J		X	X	X	X	X
415J		X	X	X	X	X
507J		X	X	X	X	X

UNIT SIZE	FLANGE MOUNTED DRIVES					
	RATIOS				BACK-STOP	MOTOR MOUNT
	4	9	14	24*		
107J	X	X	X	X	X	X
115J	X	X	X	X	X	X
203J	X	X	X	X	X	X
207J	X	X	X	X	X	X
215J	X	X	X	X	X	X
307J	X	X	X	X	X	X
315J	X		X	X	X	X
407J			X	X	X	X
415J			X	X	X	X
507J			X	X	X	X

½ to 125 hp. Up to 100,000 lb-in. torque

*20:1 ratio for sizes 107 and 115

½ to 125 hp. Up to 100,000 lb-in.

Exclusively **FALK** . . . ***Adaptability of all these three types of Falk Drives for use with Equi-Poised Motor Mount.*** **This feature reduces costs of engineering and constructing motor bases and foundations.**

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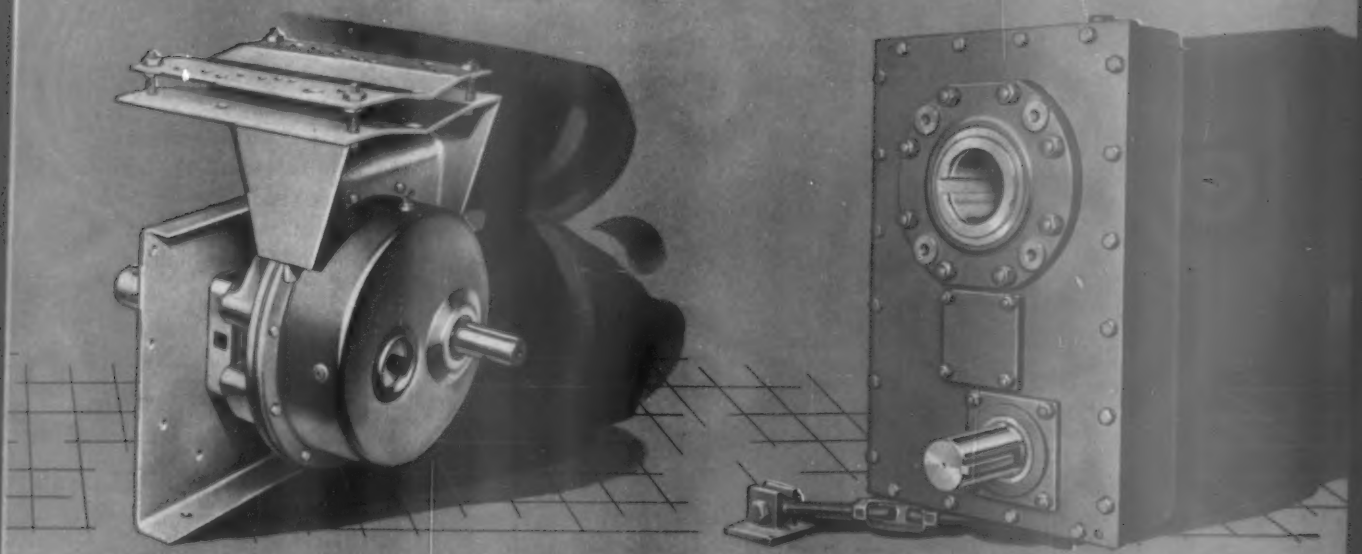

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. . . AVAILABLE FROM STOCK

UNIT SIZE	SCREW CONVEYOR DRIVES				
	RATIOS				MOTOR MOUNT
	4	9	14	24*	
107J	X	X	X	X	X
115J	X	X	X	X	X
203J	X	X	X	X	X
207J	X	X	X	X	X
215J	X	X	X	X	X
307J	X	X	X	X	X
315J	X		X	X	X
407J			X	X	X
415J					
507J					

½ to 40 hp. Up to 44,000 lb-in. torque

***Exclusively* FALK...*Single* helical gears used in *all* sizes and types—they provide maximum (98½%) efficiency per gear mesh.**

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New 2 LARGER SIZES OF SHAFT MOUNTED DRIVES—415-507

Falk-designed and Falk-built for higher torque requirements, these all-steel, *helical* gear reducers are available in Shaft and Flange Mounted Drive design.

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A POINT TO PONDER..when you need gear drives or shaft couplings of "FALK OR EQUAL" quality, where but from Falk can you get the "OR EQUAL"?

What do you need

ROAD SPEED?

"With stockpiles of 9 different materials spaced along 3,000 ft. of river frontage, we needed fast road speed as well as fast loading of our own and other trucks. The H-90 PAYLOADER with travel speed up to 29 m.p.h. on top of its loading capacity answers our requirements — prevents truck tie-ups and time losses."

CARRY SPEED?

"One of the reasons we like our H-90 is because of its good carry speed. It's now averaging 1½ minutes per trip with 4-ton loads of sand on a 400-foot haul to build this stockpile, and we think that is pretty good. As the stockpile grows, the haul will increase to 600 feet."

LOADING SPEED?

"If we get crowded because we can't load the trucks fast enough, the boys (truck drivers) won't wait more than 5 minutes before going somewhere else. So we had to give them better and faster service. Our bigger H-90 is about 40% faster than the unit it replaced and makes the difference."

EASE of OPERATION?

"This H-120 is the fastest working big loader we ever had. Even with a 23-truck fleet on a short haul, I am waiting for trucks. I don't have to work very hard because it's a dream to operate — with its power controls, fast response and clear open vision of the bucket and the area all around the machine at all times."

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more than 20 models in 8 capacity ranges

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in a tractor-shovel?

VERSATILITY?

"Our H-90 gives good, efficient production on load-out work. It has adequate power to get top production without overloading the engine. The brakes are real good and it's economical on fuel. We use is for quarry clean-up, stockpile load-out and stripping overburden. It also has to load out the shot rock in emergencies."

RELIABILITY?

"We have enjoyed good performance ever since we started using PAYLOADER machines. Our present fleet consists of an HU, an H-70 and this new H-30. We have experienced continuous production and service with a minimum of repairs. Our operators appreciate the ease of operation and safety that are built into all our PAYLOADER units."

SAFETY?

"We purchased the H-50 for many reasons: The dependable service from our older Hough's, the no-spin differential for better traction, fast shifting, speedy operation. But most of all we like the greater operator safety over other makes . . . its better balance and excellent vision with no chances of operator getting caught in the lifting arms."

EASE of SERVICING?

"We like the H-90 real fine and bought it after several days demonstrations of two other makes. One thing we like about the Hough is the ease of servicing — a lot fewer grease points, more accessible, and faster and easier to take care of. The operators prefer the position of the levers in the Hough, too."

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ROCKY'S NOTES

by NATHAN C. ROCKWOOD

The Soil and Its Fertility

A RECENT BOOK under the above title* is one that we are sure will prove interesting and helpful to many of those readers who produce and sell such materials as lime, agricultural limestone, rock phosphate, gypsum and other rock products used as or with fertilizers. It is written with the layman in mind, and any reader with an elementary knowledge of chemistry can readily understand the contents. Moreover, it is written in a style to be really interesting reading. We are nearly a year behind in reviewing it here, because we wanted to read and absorb as much as possible, although our interest is, of course, academic.

Authors H. Teuscher and R. Adler are, respectively, horticulturist and curator of the Montreal Botanical Garden, and a consulting chemist, with the collaboration of Jerome P. Seaton, associate professor of soils, Purdue University. Thus, the text combines three different points of view. The publisher honestly describes the book as "a broad survey of the physical, chemical and dynamic properties of the soil," emphasizing "the interacting factors which determine soil content and relate soils to plants which grow on it as well as to the lower animals and microorganisms which live in it."

This book is an eye-opener to those of us who have been thinking of soil mostly as decomposed or pulverized rock—the greater variety of mineral content the better. The best soil mineral aggregation possible would not support plant life without decayed organic matter and myriads of bacteria and numerous other forms of life and energy which are continually at work on the inorganic minerals to convert them into plant food. Unless the soil user takes all these things into account, together with many other factors such as climate, rainfall, temperature, etc., he cannot use such products of our industry as agricultural lime or limestone intelligently. And if the producer and seller of the limestone is not prepared to tell the user or farmer how, when and where to use his product intelligently, he is as a salesman far behind the times.

The text is divided into seven parts or sections as follows: (1) composition and contents of the soil; (2) physical condition of the soil contents and their properties as related to plants; (3) soil dynamics—the interacting forces within the soil (the living soil); (4) the main nutrient elements, their origin and their behavior in the soil; (5) manures, composts and fertilizers; (6) the laws of soil fertility, (7) summary of scientific and practical procedures. Throughout the text the authors continually emphasize that to maintain a correct soil balance for maximum results is a constant and never-ending task, requiring accurate knowledge of the particular soil under cultivation.

Having observed the development of the agricultural lime and limestone industries for more than 40 years, we naturally are most interested in the references the authors make to these particular rock products. We might say here at the start that the authors favor the use of pulverized limestone in nearly every instance, with the exception of neutralizing very acid soils. Their objection to using hydrated lime, they contend, is that it works so fast there is danger of overliming, which is detrimental to some plants. The main object in using lime in any form appears to be to obtain and maintain a nearly neutral soil condition so far as possible (pH around 7).

Calcium and magnesium are, of course, recognized as very important plant nutrients. Even silicon is now recognized as a plant nutrient, being contained in the stems and leaves of all plants. Moreover, the authors say: "It has been suggested that silicic acid in colloidal form facilitates, in some as yet unexplained manner, the assimilation of other elements by plants. No definite proof of such action has so far been obtained." Silicon in

Please turn to page 190

* "The Soil and Its Fertility," by H. Teuscher & R. Adler, Reinhold Publishing Corp., 430 Park Ave., New York 22, N.Y., price $12.00

GOODYEAR

Q: What do Goodyear Earthmover Rims have that no others have?

A: MORE times FOUR

1. MORE rims on the job: More tons are hauled on—more earth-moving equipment rides on Goodyear rims than on any other kind. Result: You reap the benefits of the widest, soundest experience in rim design, manufacture and use.

2. MORE kinds of rims: Maximum rim performance stems from proper specification. Goodyear makes the *only complete line* of earthmover rims. Result: The choice that permits you to get exactly the right rim for the job.

3. MORE rim engineering help: Goodyear has more engineers designing *and selling* rims than any other company. And they know tires, too. Result: The help you need in choosing the right rim for top performance—longer tire life.

4. MORE rim "firsts": The first *true* earthmover rim, the first 5° rim, the first tubeless rim—in fact, every major earthmover rim advance was made by Goodyear. Result: The very latest in rim design and manufacture at work, for you.

What better reasons for choosing Goodyear as your rim supplier? Only these: The desire and ability to design and build any rim that may be needed for *tomorrow's* earth-moving equipment. No matter what your rim needs or plans, you'll find it pays to call on Goodyear. See your local rim distributor, or write: Goodyear, Metal Products Division, Akron 16, Ohio.

Lots of good things come from

GOODYEAR

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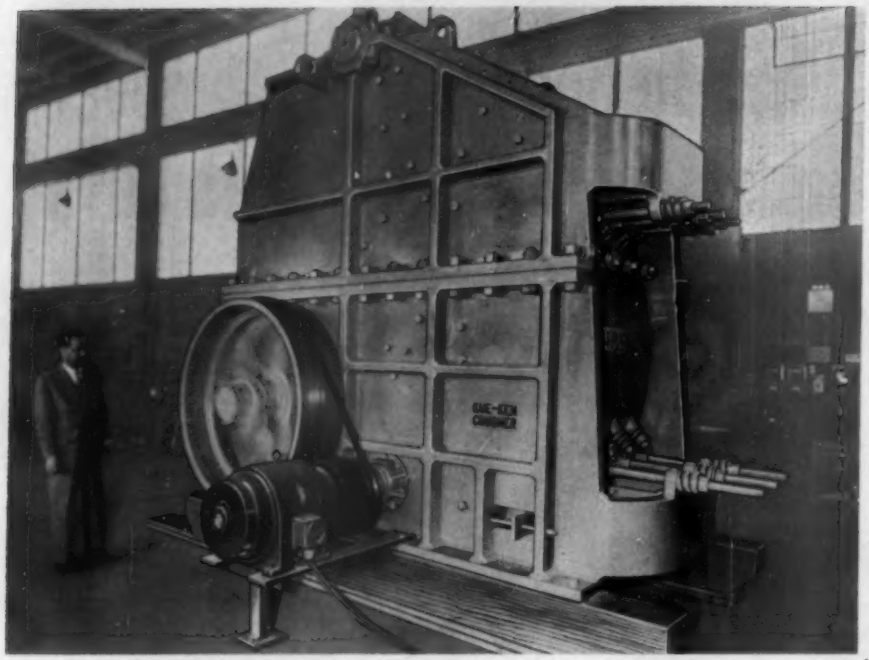
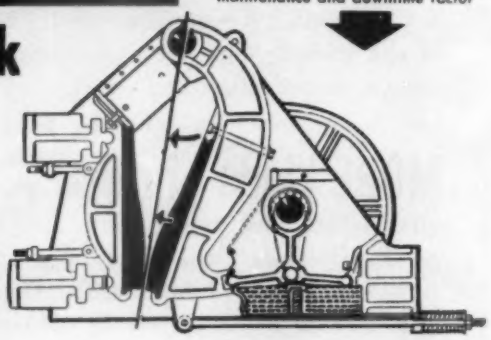


KUE-KEN "crushing without rubbing" lengthens jaw plate life at least 5 times! The pendulum type jaw supported on a stationary hinge pin in center line of the crushing zone swings in an almost straight line to crush rocks squarely without rubbing. This eliminates the main cause of premature jaw plate wear with conventional crushers. The four KUE-KEN jaw plate sections of the massive 48" x 42" KUE-KEN (above) are reversible and interchangeable for maximum utilization. With KUE-KEN, jaw plates cease to be a major maintenance and downtime factor

KUE-KEN®... the hard rock crusher with 5-way power savings



Economy in power consumption is a major factor in Kue-Ken lowest cost per ton crushing. This high speed, high capacity crusher is specially designed so that every working part operates smoothly and efficiently. Kue-Ken is a precision machine designed and engineered with these power saving features:

1. Operating on the patented "crushing without rubbing" principle, Kue-Ken utilizes power to crush rock and not to wear out jaw plates.
2. Kue-Ken pendulum type swing jaw eliminates lifting heavy unbalanced parts. It is driven by toggles that multiply leverage 3 to 1.
3. With maximum leverage at the top of the swing jaw, large rocks are crushed with less power.
4. The single light weight flywheel is easily started with a normal duty squirrel cage motor.
5. Kue-Ken precision machined toggle mechanism operates in a sealed, filtered oil bath to reduce wear and friction to the absolute minimum. Power that is wasted in non-sealed, dirt-catching mechanisms is fully utilized by Kue-Ken in crushing rock.

Kue-Ken also provides positive protection against damage by tramp iron. An automatic, adjustable safety release integral with the flywheel ends shearing or breaking parts. Production is resumed in minutes. In 33 sizes from 12" x 7" to 48" x 48", Kue-Ken Crusher crushes more rock with less power for lowest cost-per-ton crushing.

KUE-KEN® CRUSHERS

"CRUSHING without rubbing"

STRAUB MFG. CO., INC. 8381 Baldwin St., Oakland 21, Calif.

Jaw Crushers Gyratory Crushers Overhead Eccentric Crushers Revolving Screens Classifiers Feeders Rib Cone Ball Mills Concentrating Tables Vibrating Screens

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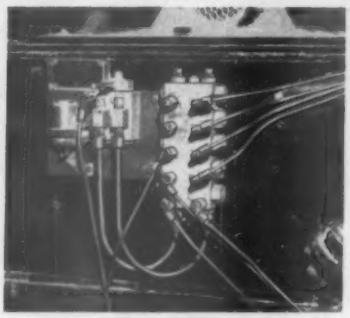
This "big baby" bites deep and hard

...AND ALEMITE CENTRALIZED LUBRICATION KEEPS IT WORKING SMOOTH AND SURE!



This centralized system is located on the crawler assembly of a giant quarry shovel. Other systems lubricate boom sheaves, house bearings, automatically.

For quarry shovels that operate 24 hours a day, protection against dust, dirt, and other elements is a must. With an Alemite Accumatic Centralized Lubrication system, around-the-clock production is insured.

Whether it's power shovels, crushers, dust collectors, conveyors, coolers or any piece of equipment needing lubrication, Alemite can "Tailor Make" a centralized system to eliminate lubrication problems.

Alemite Centralized Lubrication Systems protect equipment with pre-determined amounts of lubricants from one central point to every point where it's needed. Lubrication is quick, safe and positive. And there's no waste. Equipment life is extended, downtime sharply reduced. End result: more production . . . and increased profits.

See "The Better Way"—a new, factual color film produced by Alemite to show how one mill has increased production and profits through modern lubrication practices. Write today!

Symbol of SW Excellence

ALEMITE DIVISION
STEWART-WARNER CORPORATION

In Canada: Stewart-Warner Corporation of Canada, Ltd., Belleville, Ontario

Dept. T-51, 1850 Diversey Pkwy., Chicago 14, Ill.

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At pug mill, Michigan Dozer moves 550 tons hourly up to 150 feet.

Major Southern quarry chooses Michigan Tractor Dozer for top-production job

375 hp model feeds 550 tons hourly to pug mill

Same unit also handles shovel and blast cleanup in pit ½ mile from mill.

At its top rate, this Michigan Tractor Dozer moves 550 tons of crushed stone an hour!

Pushes, one-way, range up to 150 feet.

Same unit also cleans spillage around two rock shovels located ½ mile away.

It alone does the work of two 50,000 lb class crawler dozers.

Owner: Lambert Brothers Division of Vulcan Materials

The Dozer is a 375 hp, 74,000 lb Model 380 Michigan. It is owned by Lambert Brothers Division of Vulcan Materials Inc, Birmingham, Alabama, one of the nation's largest stone pro-

New Michigan Tractor Shovel, latest of 15 owned by Lambert, truck-loads 3,500 tons daily

One of Lambert Bros 15 Michigan Tractor Shovels. This unit, a new Model 175A with 3¼ yd bucket, handles all truck-loading, also dresses stockpiles in Lambert's Nashville quarry. It loads 200 to 250 trucks, 3,000 to 3,500 tons per 8-hour day. Each pass—2700 lb/yd 3" stone down to —100 filler dust—averages 4 tons, each load cycle takes 20 to 30 seconds. Unit works out of 25 stockpiles, scattered over 100 acres. Furthest run is ¾ mile—easy for the Model 175A's fast rubber-tired speed of 27 mph.

ducers. The Lambert Division alone operates 25 quarries in Tennessee, North Carolina, Kentucky, and Virginia; they are using this Dozer in their 80 acre pit near Nashville.

The story starts last summer. Harold and Glen Lambert had just installed the pug mill and needed something to feed it. Their existing crawler dozer wouldn't do; it obviously didn't have the mobility to do both pit cleanup and mill feeding. Another big *crawler* would be needed, it seemed. Then Nashville distributor McCarthy, Jones & Woodard suggested a rubber-tired Michigan Tractor Dozer. One was tried. The problem was solved. From four available sizes, a 375 hp model was chosen as best suited to the need (the other size Michigan Dozers: 162, 262, and 600 hp).

Main jobs: feed mill, clean around shovels

The 375 hp machine has been busy ever since.

Most of the time it works at the pug mill—dozing out into a stockpile from the feeder belt when the mill isn't running—feeding when the mill is running at a higher rate than available plant production (half or more of the crushed rock is fed into trucks and hauled to regular stockpiles).

Four to eight times a day, the 25 mph Michigan leaves the mill and drives down blacktopped roads to the quarry for shovel cleanup. Unit makes the ½ mile trip, which took crawlers 20 minutes or so one-way, in 2 to 3 minutes.

50% cut in shovel cleanup time

In the pit, the Michigan saves more time (and money). Back in Lambert Brothers crawler days, a good operator could clean the spillage around one shovel in 5 or 6 minutes. Today, their high-speed Michigan does each cleanup in 2 to 3 minutes.

50% cut in blast cleanup time

Another example of time saved is in blast cleanup. Once or twice a week, Lambert's crew shoots the 90 ft high quarry face. Each blast breaks about 22,000 tons of limestone, throws some rock as far as 600 ft. Used to take a crawler 45 minutes to an hour of full-time work to police the area. Now, the Michigan Tractor Dozer cleans up in 20 to 30 minutes.

Sound worthwhile for *your* job? Why not check first-hand? Drop us a line—or call—we'll show you a Michigan Tractor Dozer in action so you can judge for yourself.

Travel speed, job to job over pavement, reaches speeds of 25 mph.

Michigan is a registered trademark of
CLARK EQUIPMENT COMPANY
Construction Machinery Division

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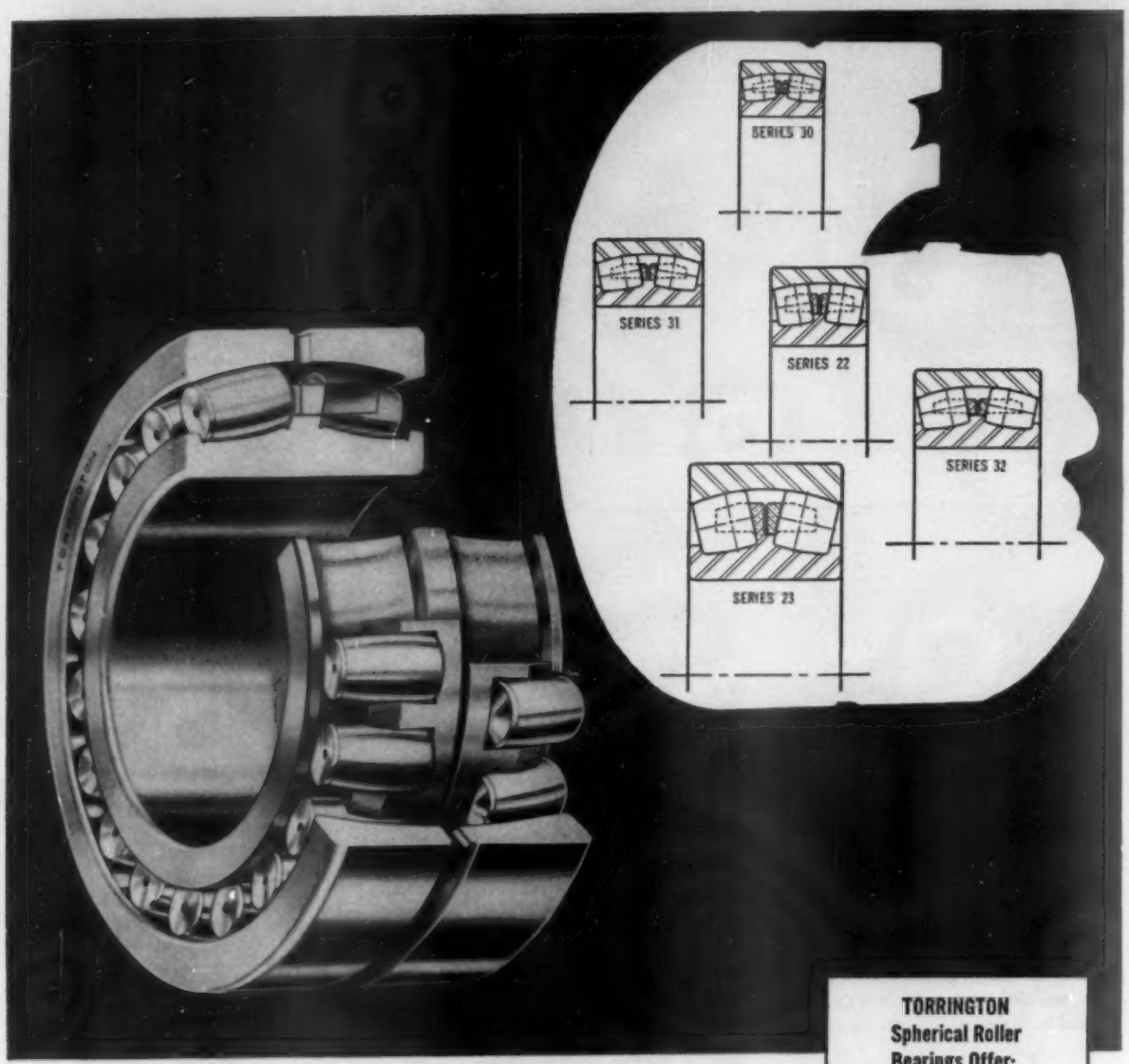

There's a Torrington Spherical Roller Bearing for your application

Bearings matched *exactly* to the job pay off in better performance, longer life, greater reliability. That's why it pays to specify carefully. And that's why it pays to choose Torrington Spherical Roller Bearings.

Whatever your space limitations or capacity requirements, the five series of Torrington Spherical Roller Bearings provide the right bearing for virtually every industrial application. You can design for straight bore or tapered bore with adapter. You can benefit from extra features such as lubrication groove and oil holes, or selected outside diameters.

Your use of Torrington Spherical Roller Bearings will assure exceptional operation and longer bearing life under the toughest conditions. They're made to Torrington's own uncompromising standards—the highest in the field of anti-friction engineering—by the manufacturer of every basic type of anti-friction bearing.

TORRINGTON Spherical Roller Bearings Offer:

- conformity of rollers to raceways
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- land-riding bronze cages
- maximum radial and thrust capacity
- controlled internal clearance
- electronically selected rollers
- inherent self-alignment
- even load distribution
- long, dependable service life

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WASHINGTON LETTER

by EDGAR POE

Administrator Outlines his Road policy

Rex L. Whitten, new federal highway administrator, declares his aim as administrator will be to complete the accelerated highway construction program as quickly as possible. He has made clear his opposition to a stretch-out. The new official, who was connected with the Missouri Highway Department for 40 years, is emphasizing two points. He says he favors continuance of state-federal cooperation in the road building program, and he is going to do all he can to promote the accelerated program, which he maintains will "save lives and save money."

"I'm against sin, and I am against fraud," exclaimed Whitten. "We are going to have an honest Administration."

In an obvious reference to the hearings being conducted by a House Highway Subcommittee under Rep. John A. Blatnik of Minnesota, Whitten said apparently there have been some irregularities and fraud in connection with the multi-billion dollar program. The Blatnik Committee is investigating reports of road scandals in five states, including Florida, Georgia, New Mexico, Massachusetts, Illinois and South Dakota.

The Interstate system now has 10,000 miles open to traffic: Work is currently underway on 14,600 miles, of which 1,600 miles will be open to the public by Christmas.

FAA issues Terminal guide For airports

A guide to the design of airport terminal buildings for cities having scheduled air carrier service has been published by the Federal Aviation Agency. The booklet, "Airport Terminal Buildings," is aimed at reducing the research required for economical and functional planning. It is intended to answer the question "How much to build?"

Prepared by the FAA Bureau of Facilities and Material, the booklet illustrates how passenger traffic activity at a given airport may be analyzed to forecast future passenger volumes. This includes passenger and baggage flow requirements in the terminal building that have a direct bearing on ticket offices, waiting rooms, dining areas and other needs. The highly illustrated publication has been designed to offer important technical information in graphs and drawings. Floor size requirements based on passenger volume are given for airports having up to five million enplaning and deplaning passengers per year. This information also provides for a busy day, peak-hour volume reaching as many as 1,800 enplaning and deplaning passengers.

One section of the booklet is devoted to methods of controlling jet aircraft noise inside the terminal building. Sound and noise as forms of energy are outlined in simple terms and through informative drawings. Methods of design and types of building materials to block jet noise in airport buildings are given in detail.

Long submits Government Patents bill

Establishment of a new Federal agency—the Federal Inventions Administration—is proposed in a bill introduced by Senator Russell B. Long (D-La.). He said the bill would require the U. S. Government to retain full rights to all technological and scientific achievements paid for with tax dollars. The agency would utilize the government's ownership to promote in the public interest "the widest use and knowledge of discoveries" growing out of research and development done at public expense.

The Louisianan asserts that a long study shows that some government departments and agencies, "without authorization of Congress, have given to private contractors what rightfully belongs to the public."

"Scientific and technological developments achieved through the spending of public money," said Long, "have become the patented property of private contractors to be used by them for their exclusive advantage and in conflict with the public interest."

Besides the bill, Long submitted a Senate resolution calling for a Senate Select Committee on technological developments to be established for a 2-year period.

Please turn page

Goldwater Offers new Labor plan

Senator Barry Goldwater of Arizona, the country's foremost Republican figure on Capitol Hill this session, is sponsoring a broad new labor program. He avows that a dire need exists for more economic and political freedom among American workers and more respect for law and order in the conduct of labor-management relations.

Senator Goldwater would prohibit policies by which labor unions can arbitrarily exclude some qualified workers from membership and thereby deny them jobs. He would end the indiscriminate use of union funds for political purposes without the consent of members, whose dues, assessments and initiation fees make up those funds. He wants to provide additional safeguards against violence in labor disputes, restoring respect for law and order. Strengthen the Bill of Rights provision of the Landrum-Griffin Act, he insists: Permit a secret strike ballot to be conducted by the National Labor Relations Board upon petition by 30 percent of the employes affected.

J. F. K. has big Plans for Classrooms

Should the Administration's big federal aid to education program become law, the construction industry would get a substantial boost. The program calls for $5.6 billion in federal assistance to education; much of this would go for classroom construction. The President maintains that it is necessary to build a total of 600,000 classrooms in the next 10 years. However, the U. S. Chamber of Commerce insists that there is a surplus of classrooms already in many parts of the country, so the proposal faces rough sledding.

Legislative Picture on Capitol Hill

A series of major bills are pending in Congress. Although some will pass, others will never reach the White House for the President's signature. The early spring picture indicates that a depressed areas bill will become law in some form. The minimum wage bill probably will pass in a compromise form, as Congress will not approve a $1.25 an hour minimum. An omnibus housing bill will likely pass, but hundreds of millions of dollars in aid to education will be battled all the way and could go down in defeat.

There will be some highway financing legislation passed to keep this vast program on schedule. It also appears that there will be legislation to provide federal funds to accelerate a program to curb pollution of the nation's rivers and streams, as well as grants for airports.

The 41,000-mile Interstate system of multi-laned, stoplight-free highways will be slowed down unless Congress provides more funds. About $900 million a year more is needed. Therefore, it appears certain that the reduction in the Federal gasoline tax, scheduled to decline from 4 to 3¢ a gallon July 1, will not take place. Instead, Congress seems fairly certain of extending the 4¢ tax. President Kennedy not only is asking that the gasoline tax be extended, but recommends a tax increase on tires, diesel fuel and trucks weighing over 26,000 lb.

Inter-American Bank operating

The Inter-American Bank is now providing technical assistance to governments or private investors in the preparation of projects for financing. The Bank came into legal existence after 19 Latin American countries and the United States ratified the institution's articles of agreements. Cuba did not join the bank. Authorized resources amount to $1 billion. Of this, $850 million is ordinary capital resources and $150 million is a fund for special operations. The entire operations of the bank are designed to aid in further developing our neighbors South of the Border.

Engineers try To reverse Trend

A maximum per diem rate of $100 for experts and consultants temporarily engaged by federal departments and agencies has been urged by the National Society of Professional Engineers in statements to both House and Senate Appropriations Committees. Paul H. Robbins, executive director of the Society, cited an apparent trend in appropriation measures to reduce the maximum per diem allowance for experts and consultants. Present rates of $50 or $75 which, in some instances, formerly were $100 are inadequate for the economically feasible performance of consulting engineering services due to existing high overhead expenses, he told the Congressmen.

"The net result of a federal limitation less than $100 per day could very well be that the most qualified engineering firms would refrain from undertaking projects for the government, leaving the government's choice to less qualified consultants," Robbins said. "This is a situation in which the federal agencies can ill afford to be placed."

Step up your ***TRACTOR LOADER***

WITH ALLIS-CHALMERS

Here's a project geared to the demanding standards of today's earth-moving men... bringing them the benefits of Allis-Chalmers' massive research and development in the form of significant product improvements. Here, for example, is some really special news about tractor loaders.

POWER
Performance
Operator comfort
Wearability
Ease of maintenance
Reliability

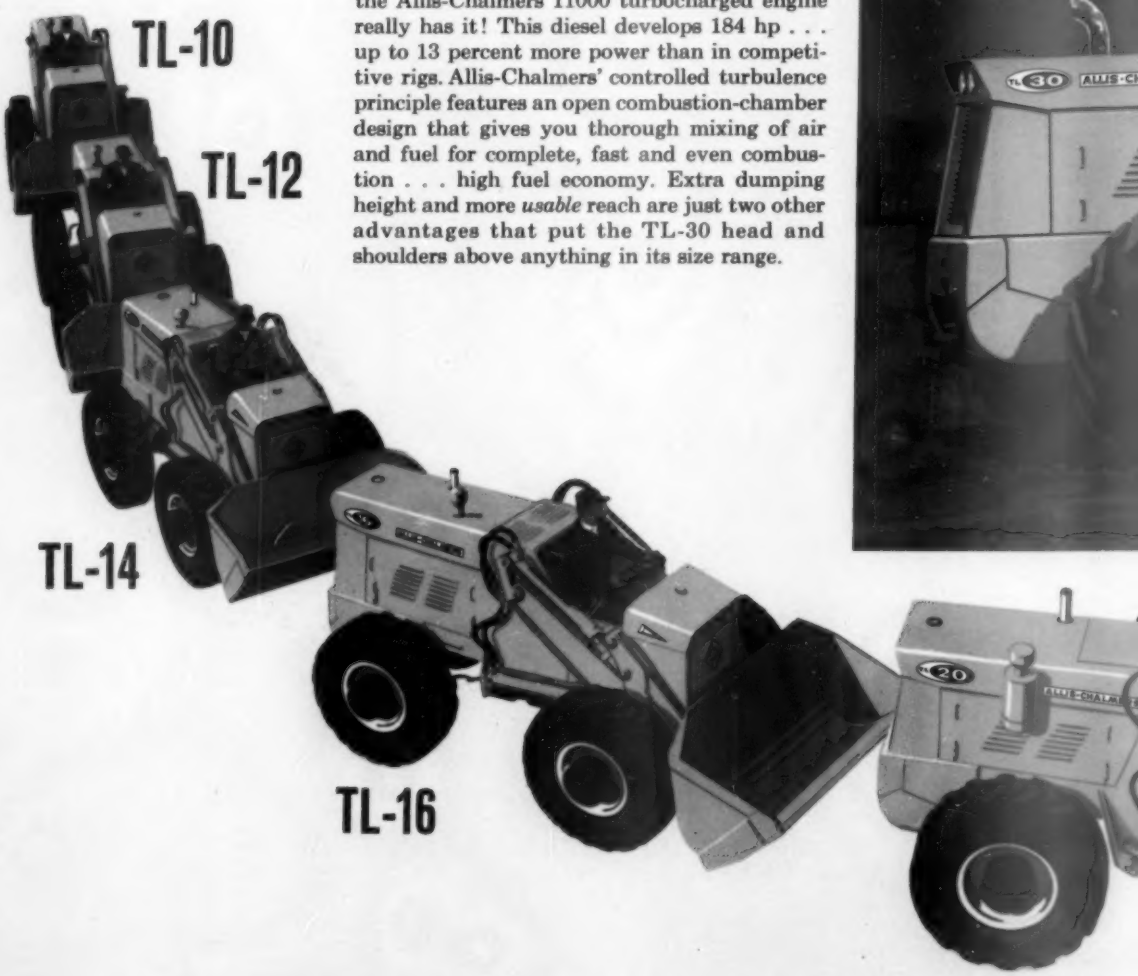
ANOTHER BIG TRAC
JOINS THE ALLIS-C

a line designed to help you set new production records

184-HP TL-30

Here's extra power and capacity to step up your production, excavating, hauling and dumping. The TL-30 gives you all of the basic performance advantages that have earned Allis-Chalmers loaders wide acceptance around the world.

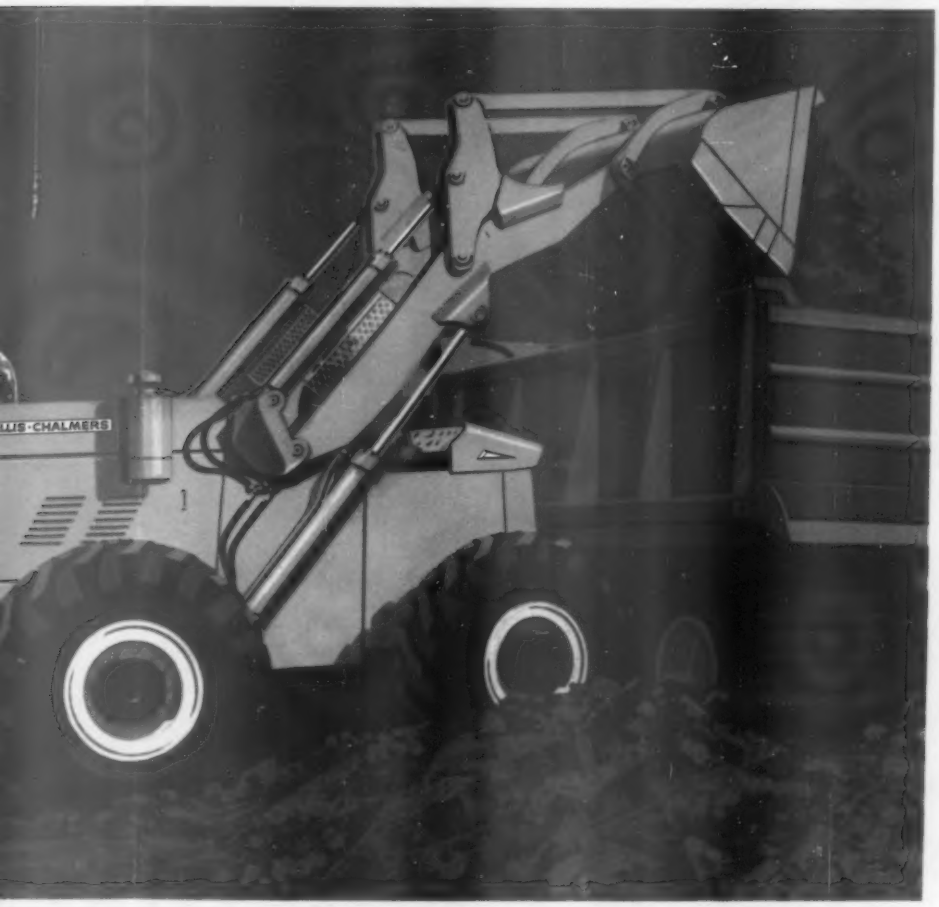
You'll go for the TL-30's new 10,500-lb carry capacity . . . up to 16 percent more than others in its class. When it comes to economy, the Allis-Chalmers 11000 turbocharged engine really has it! This diesel develops 184 hp . . . up to 13 percent more power than in competitive rigs. Allis-Chalmers' controlled turbulence principle features an open combustion-chamber design that gives you thorough mixing of air and fuel for complete, fast and even combustion . . . high fuel economy. Extra dumping height and more *usable* reach are just two other advantages that put the TL-30 head and shoulders above anything in its size range.

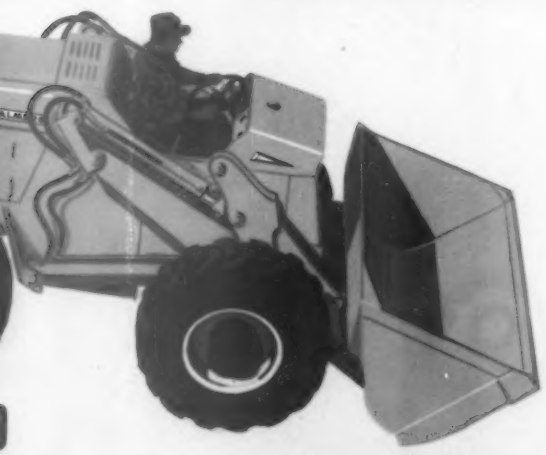


3,600 to 10,500-lb carry capacity • 1- to 6-cu-yd buckets • 77 to 184 hp

ACTOR LOADER
-CHALMERS LINE...

rds...whatever your over-all job requirements.

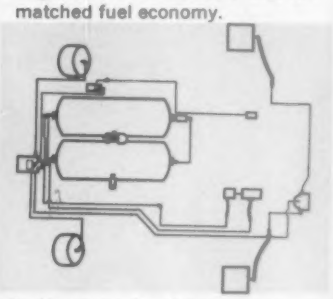




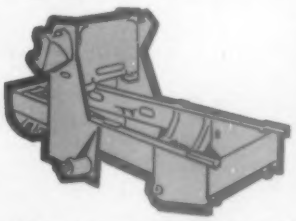
TL-30 10,500-lb carry capacity
2½- to 6-cu-yd buckets
Weight: 28,400 lb

There's more to this important
TRACTOR LOADER STORY
turn the page...

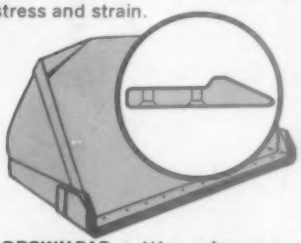
11000 turbocharged diesel engine—conservatively rated at 184 hp. One of the healthiest lines of engines in the business, with unmatched fuel economy.



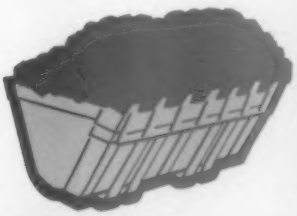
Safe, sure braking power—four-wheel air brakes let you work with confidence even on the steepest grades or stockpiles.



Full box frame—high-strength steel provides a solid backbone for the tractor loader . . . soaks up stress and strain.

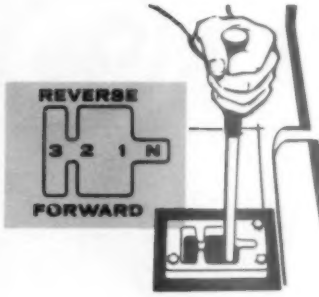


ARROWHEAD cutting edge—provides added strength and protection for the bucket bottom and sides . . . extends service life.



10,500-lb carry capacity—gives the TL-30 as much as 1,500 lb more carry per bucket load than others of comparable size.

Full command in the palm of yo hand—with single-lever control. Y go into and out of any speed, forwa or reverse, with just a quick mov ment of the lever. Operators work peak capacity all day long.



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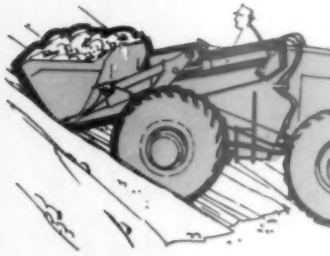

Ideal dump cylinder location—up an away from dirt and grit that scor piston rods . . . damage vital hydrauli components. And, because cylinder are not attached directly to th bucket, there's less dead weight . . more "pay" weight.

Production-boosting attachments- special buckets, lift forks, crane hoo backfiller blade, bucket teeth, ripper log tongs, long booms.

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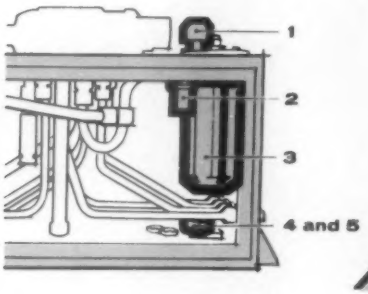
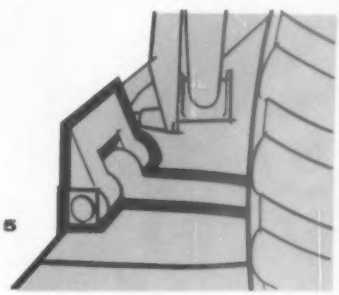
Extra lift and reach—brings fast, smooth loading of high side-boarded trucks. The TL-30, for instance, offers 10′ 4½″ of dumping clearance . . . a foot or more extra lift than others of this size.

5-way hydraulic filtering—for complete system protection. Two air filters and three hydraulic oil filters assure peak operating efficiency . . . extended service life. Filters are easily accessible for cleaning and replacement.

Pin-connected axles—directly attached to the frame with thick, solid steel pins (not lightweight U-bolt connections). On rugged terrain, there's no shifting or rolling of axles under load. Allis-Chalmers tractor loaders stay on the job.





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TO YOU ONLY IN ALLIS-CHALMERS TRACTOR LOADERS

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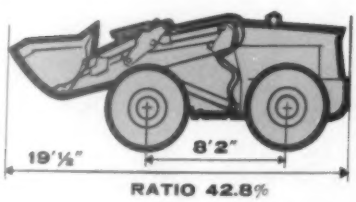

RATIO 42.8%

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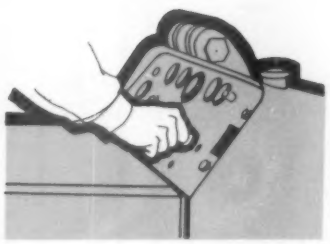
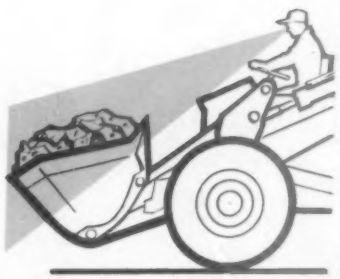
Top stability—For example . . . the TL-30 has an 8′ 2″ wheel base to a 19′ ½″ over-all length . . . a 42.8 percent ratio of wheel base to length for plenty of stability to eliminate tipping or spilling even on rough terrain.



Key starting—just like a car. No cranking, pumping or waiting for these machines. Just a turn of a key and you're ready to work.



Control tower visibility—with tapered hood . . . narrow cowl and unobstructed view of front-mounted equipment. Bucket-type seat is adjustable to operator's own preference.

ents—
hook,
ripper,

See an Allis-Chalmers tractor loader before you buy your next unit. You'll find a model and size best for you in every way—in power, in production, in value. Your Allis-Chalmers dealer will demonstrate on your job, gladly!

Your Allis-Chalmers dealer is in business to . . .

PROTECT YOUR EQUIPMENT INVESTMENT WITH COMPLETE SERVICE

When you invest in Allis-Chalmers equipment, you get top performance in *every respect*. Your Allis-Chalmers dealer is fully equipped to serve you completely, conveniently. Make him your single source for:

- **Complete Parts Service**—original-quality parts on hand to meet your requirements quickly.
- **Ready-to-go Exchange Assemblies**—completely reconditioned assemblies on call. Your trade-in assembly is rebuilt without overtime charges . . . your machine is back to work quickly. Your cost? Only parts and regular-time labor needed to recondition your old assembly.
- **Specialized Service—Shop or Field**—top-notch mechanics are factory-trained to service your needs efficiently in a fully equipped shop or on your job.
- **Tailored Financing**—terms suited exactly to the financial requirements of all your machinery needs.

From one convenient source, then, you get the complete service package—job application information, new and used equipment, parts, service and financing. Who could be more interested in backing you up than your own dealer? That's his *business!*

Your every transaction in sales, parts, service and financing is fully backed and .....

Certified FOR YOUR PROTECTION
BY YOUR ALLIS-CHALMERS CONSTRUCTION MACHINERY DEALER

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POWER **FOR A GROWING WORLD**

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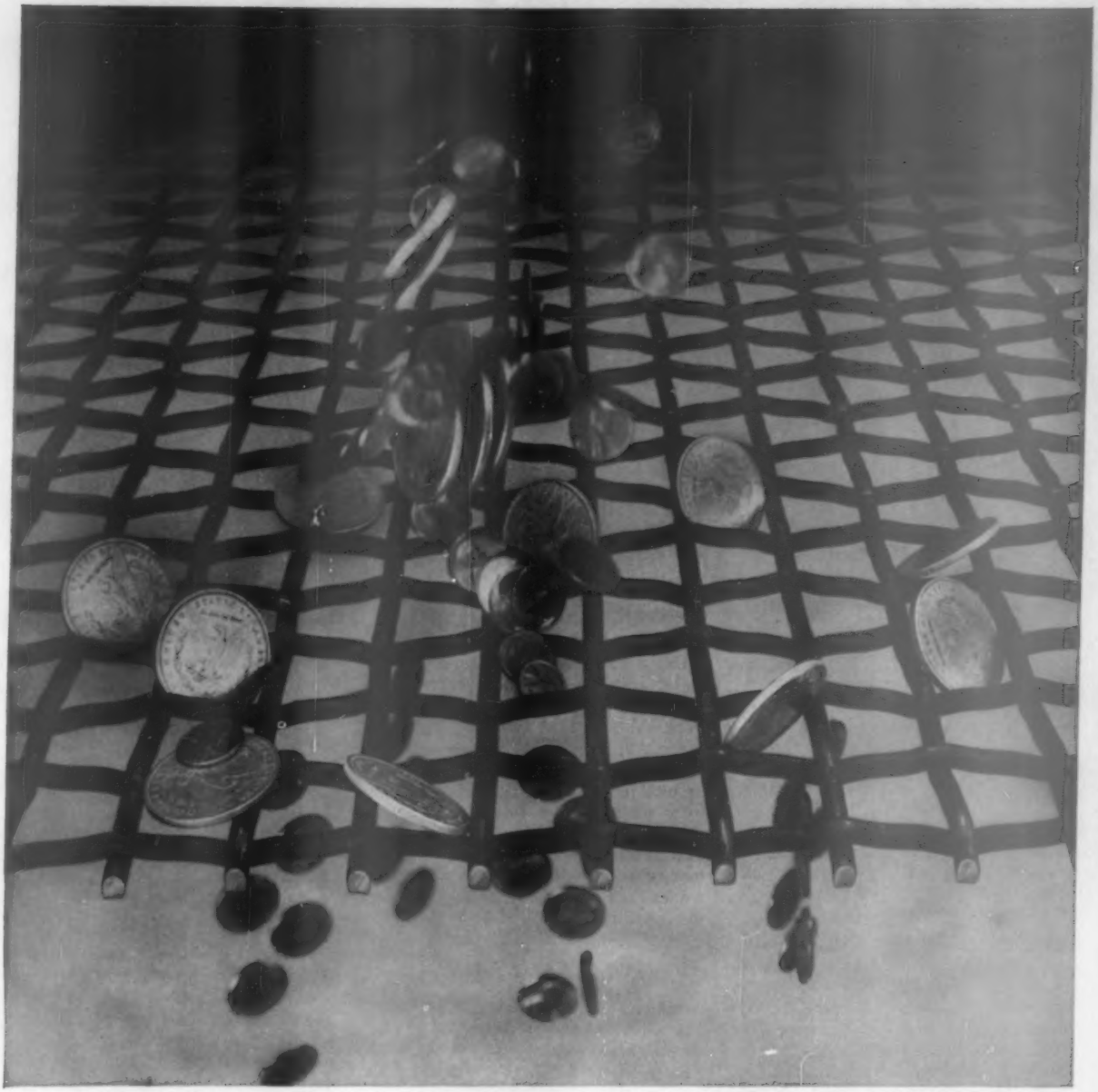

This screen never passes the buck

When you use CF&I Space Screens, you'll find your costs will be reduced from "dollars" to "pennies."

Because of their great resistance to the most punishing abrasion and vibration, CF&I Space Screens are long-lasting on even the toughest jobs. This cuts your screen repair and replacement costs, reduces equipment downtime and lowers the cost-per-ton of material screened. Your CF&I representative will be happy to give you complete details. Call him today.

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LABOR RELATIONS

A ROUNDUP OF ACTUAL DAY-TO-DAY IN-PLANT PROBLEMS AND HOW THEY WERE HANDLED BY MANAGEMENT MEN

How would you decide?

Must management pay for an honest mistake?

What Happened: Fred Calkins is the third most senior man in his department. On Thursday, Foreman Perry asked all the other members of the department to work overtime on Saturday. He overlooked Fred, whose work is somewhat removed from the rest. However, the next day Fred was offered the overtime assignment. He turned it down.

"I'm burned up over your forgetting to tell me yesterday. Just this noon I accepted an invitation to Moose Lodge for Saturday. I think my friends are throwing a surprise birthday party for me."

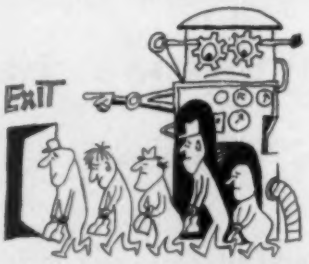
The following week Fred asked the company for overtime pay which he would have earned on Saturday. He claimed that the company owed him the money because it violated the contract. The agreement says that "the company will give at least 24 hours' notice, except in emergencies, when overtime will be necessary on Saturdays . . . ." He argued that (1) this was no emergency; (2) the company should have given him enough time to plan for the overtime work, (3) the company had paid for unworked overtime in the past.

The supervisor turned down Fred's claim for the overtime pay. But he did offer Fred the chance to choose any Saturday overtime work in the future.

Was the supervisor:
Right? ☐ **Wrong?** ☐

What Arbitrator Sembower ruled: "Most arbitrators grant compensation to an employe who has been overlooked in the allocation of overtime work. Although the company displays a spirit of fairness in proposing that the grievant be given an opportunity to pick another overtime day, some form of redress is fully justified. It seems sound in this instance to follow past practice of the company to sustain compensation in lieu of overtime work. Fred Calkins is to be paid for the overtime hours."

Must you negotiate with the union when you combine or eliminate a job?



What Happened: A sharp reduction in demand for its products resulted in a drop in the company's profits. It began to lose money and decided to make changes in production. Management held many meetings with the union. Prospects of eliminating and consolidating job assignments were considered, but not worked out in detail.

A year later the company announced that there would be revisions of job assignments. Some jobs were eliminated—others were consolidated as a result of changes in equipment and plant layout.

The union protested. It argued that management must negotiate all job consolidations and quoted the contract: "New job classifications and rates of pay shall be subject to negotiations." The union reasoned that when management assigned duties of an eliminated job to a remaining worker, this combining of jobs created a new job classification.

Management denied the union's protest for these reasons:

1. Management has the right to make job assignments.

2. The new duties are reasonable and in line with standard practices and job classifications.

3. The section of the contract which the union quotes deals with job classifications as related to wage rates.

4. We may have to negotiate about wage rates for the new assignments, but we do not have to get union approval to make these assignments.

Was the company:
Right? ☐ **Wrong?** ☐

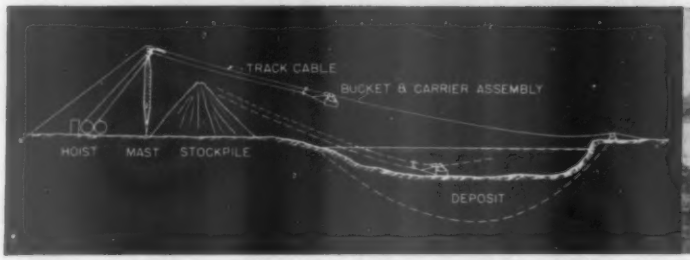
What a Board of Arbitrators ruled: "In the interpretation of the Agreement, the meaning must be sought in the total context. One must determine how it can most plausibly have been meant and understood by the parties. The clause occurs in an article under the heading of 'wages;' it would seem most naturally to have application to determination of wage rates. It is evident that the company did not intend to limit its power to change duties of employes. The actions taken by the company appear to have been motivated by requirements of efficiency and economy in operations. The company did not violate the contract."

Please turn to page 42

FROM PIT TO STOCKPILE...

Dig and Haul at Lowest Cost with a Sauerman Slackline

DIGS AND HAULS—New Sauerman Slackliner Bucket is especially designed for tough digging. It inhauls at high speed, dumps automatically, and returns to digging point by gravity.



STOCKPILES MATERIAL—Regardless of long hauls, the Slackline builds a large surge pile to allow charging the plant at any desired rate. Plenty of material is in ready reserve for seasonal or unexpected increases in schedule.

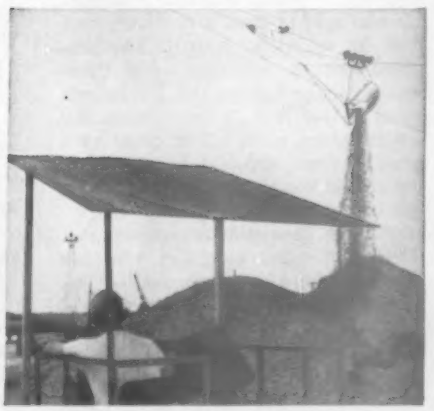
Operating costs as low as 8¢ per yd. for labor, power and maintenance are reported by Slackline Cableway owners when digging free-caving material at average depth and haul distances.

These low costs are achieved by using just one machine—the new Sauerman Slackline Cableway. Multiple equipment is not needed to supply your required tonnage. For example, on an average haul and digging depth, a single medium size machine will charge a 200 tph. plant.

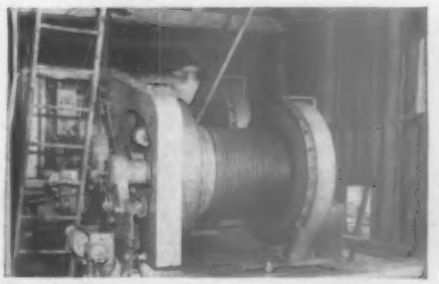
The high Slackline mast permits building a large pile which can supply plant demands through a plate feeder and tunnel conveyor, front-end loader or clamshell. The new Sauerman torque converter diesel-hoist automatically matches power to load demands and is designed for continuous duty. Fluid drive cushions out shock loads to reduce fuel and maintenance costs, extend cable life.

Increasing land values and depleting resources make it necessary to get all the material out of your deposit. You can do this with a Sauerman Slackline. The machine will dig from ground level to deep under water and keep your plant running additional years at the lowest possible operating cost. Several pits are now operating Slacklines on 1000-ft. spans with average hauls of 500 to 700 ft. and from 100-ft. depths.

Write or call, giving your tonnage requirements, depth and length of deposit—if available. We will promptly supply more information on Slackline Cableways, and show you how *to save with a Sauerman.*



CONTROL IS REMOTE, EFFICIENT AND SAFE—Control station can be conveniently located at any strategic point in plant area. Operator can watch entire operation. Fatigue is minimized and personal danger eliminated.



TORQUE CONVERTER INCREASES PRODUCTION, CUTS MAINTENANCE—Now available, the new Sauerman Torque Converter Hoist automatically matches power to load, provides a smooth and steady flow of material, reduces fuel, maintenance and cable costs.

SAUERMAN BROS., INC. 630 SO. 28th AVE. BELLWOOD, ILL.

Linden 4-4892 • Cable CABEX–Bellwood, Illinois

Crescent Scrapers • Slackline and Tautline Cableways • Durolite Blocks

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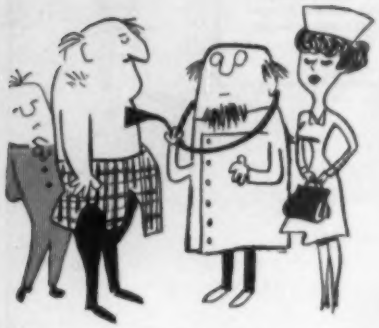
continued from page 40



Can you refuse to recall a senior man because of a disability if there are employes with the same ailment still at work?

What Happened: When the company merged, the new management set up a policy of physical examinations for all employes.

Joe Lerke was on layoff when he was called in for his physical checkup. The doctor found Joe had a hernia. He was told to have it corrected and then he would be rehired. The employe had an operation—and three weeks later he was rehired. But he was upset at his loss of pay during his 3-week absence. He felt he could have gone to work and had the operation during his vacation period. He filed a grievance:

1. You discriminated against me. There are other employes who are working with a hernia condition. They weren't put on layoff because of it.

2. You can't have two sets of rules —one for employes on layoff and one for employes on the job.

3. I was doing fine on my job before the layoff—hernia and all.

4. If I had been working, my physical disability wouldn't have come up as an issue. So why bring it up at all?

The company didn't agree with Joe:

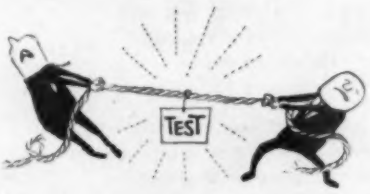
1. We set up a new policy for physical exams. This we have a right to do. We intended to examine all employes —on the job and on layoff. If Joe was working, and his hernia was discovered on his physical exam, he would have been put on layoff until the disability was cured.

2. The fact that we had not yet gotten around to other workers doesn't make Joe's case any stronger.

Was the company:
Right? ☐ **Wrong?** ☐

What Arbitrator Crawford ruled: "The Arbitrator agrees that Joe Lerke had employe status and, therefore, was subject to the same conditions and physical standards as applied to employes at work. The record does not show that different conditions of employment or physical standards were imposed on him. A substantial number of employes were on layoff at the time the program was started—but there were also employes at work at that time. And the company started with the most senior employes, going down the lists until all employes—both at work and on layoff—were examined. It is apparent that the basis for the company's refusal to permit Lerke to return to work—namely his hernia condition—would also have resulted in his layoff. There is no evidence of discrimination. Joe Lerke is not entitled to be paid."

If two employes are about equal, can management use a test to decide whom to promote?



What Happened: Management decided to improve its promotion policy. For years the measuring rod was "seniority plus ability." Now it wanted something "tangible" instead of judgment alone. So it began to use tests for promotion to certain jobs. On one of these jobs an arithmetic test was a factor. The union took issue, saying:

1. You never used tests so you can't suddenly introduce them.

2. You have plenty of protection. Each promoted employe is on 30-day probation. So you can get rid of him if he doesn't work out satisfactory.

The company came back:

1. Tests are not entirely new. For example, on some jobs employes must pass a physical exam. That's a test.

2. Management should have a right to improve its selection procedure. Tests are one way to do this.

Was the company:
Right? ☐ **Wrong?** ☐

What Arbitrator McCoy ruled: "In principle, the company cannot be denied the right to determine abilities in any reasonable way. For some jobs a look at the employe's personnel record might be sufficient. For another job, a physical examination might be reasonably necessary, and that alone. For still another, a demonstration of ability to do the job might be reasonable. It might be fairly said that a written test would be quite unreasonable for a great many jobs which call for 'a strong back and a weak brain.' But for some jobs a test would be reasonable and common sense. It is the award of the Arbitrator that where reasonably necessary to determine abilities, the company does have the right to give a written test as a determinate for promotion."

What discipline should be given to an employe who comes to work with a hangover?

What Happened: When George X didn't show up for overtime work one Saturday morning, Supervisor Coombs got into his car to try to find a substitute. About a mile from the plant he saw George driving to work. The employe was red-eyed, sleepy looking, and "looked as though he had had a big night."

The foreman told George to "go home." The worker didn't. He went into the plant. When told he wouldn't be put on the job because he had a hangover, he argued and insisted that he was all right. He finally left.

He came back to work the next day and was on the job for about a week when he was called into the personnel office and fired for coming in to work intoxicated. In its argument the company made no distinction between a hangover and intoxication. Its position was that in either state the employe was not fit to work, and if allowed to go to his job might hurt himself or someone else.

The employe admitted taking a few too many the night before, but insisted that he was okay in the morning. Discharge, he said, was far too severe.

Was the employe:
Right? ☐ **Wrong?** ☐

What Arbitrator Bonebroke ruled: "The worker was allowed to come back to work, and discharged a week later. This indicated that the employer did not consider him an undesirable employe. The penalty was too severe in view of absence of proof that the employe had been drinking that morning. Also, George X had a good record. However, disciplinary suspension is merited. An employe who comes to work with a hangover is not fit for his job. A 10-day suspension is imposed."

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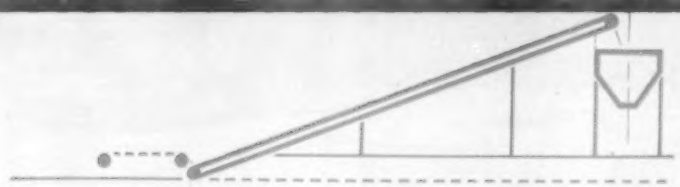
REX-RATED PRECISIONeered BELT CONVEYORS



Here is a new concept in the planning and the fabrication of belt conveyors. Now you get a Rex-Rated *Custom-Built* Conveyor *without* paying custom-built prices. And you get *faster installation* than ever before. Rex PRECISIONeered Conveyors combine the advantages of *local fabrication* with *factory PRE-engineering.*

Your franchised distributor, using PRE-engineering by REX, will give you

- **PROMPT QUOTATION**—The proposal and estimate can be prepared immediately—at your office!
- **PRECISE SOLUTION**—No need to "make do" with prefabricated structural members. REX-RATED, PRECISIONeered BELT CONVEYORS are tailored to your every requirement!
- **PROMPT DELIVERY**—Fabrication and assembly by your Franchised Rex Distributor assure delivery—when you need it!
- **PRICE THAT FITS YOUR NEED**—Distributor stocks of REX-BUILT Components; on-the-spot engineering; and locally available steel—combine to bring you ECONOMY.

Call the Franchised Rex Distributor nearest you—or write CHAIN Belt Company, 4649 W. Greenfield Ave., Milwaukee 1, Wis. In Canada: Rex Chainbelt (Canada) Ltd., Toronto and Montreal.

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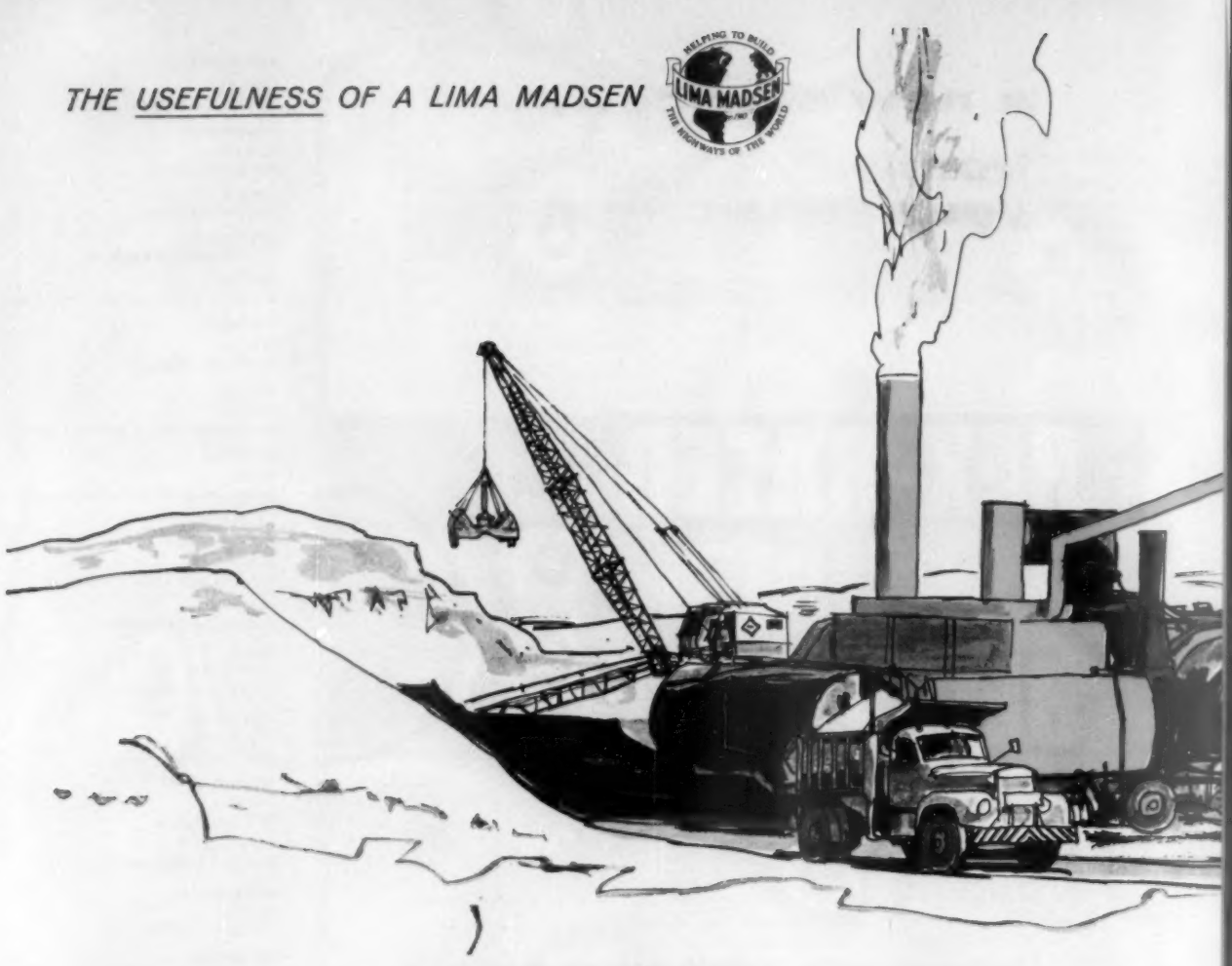
THE USEFULNESS OF A LIMA MADSEN



BIG TONNAGE PRODUCER EASILY MOVED FROM JOB TO JOB

Unit design construction of Lima Madsen Asphalt Plants means easy stacking in factory-matched sections; rapid field erection and dismantling. Screen bin, mixer weighbox, hot stone elevator, dryer, dust collector, and cold feeder may all be wheel-equipped at the factory or in the field. Lima Madsens are the ideal plants for the contractor who is after big-tonnage output and tops in portability.

Combine extreme mobility with proven capacity to turn out high tonnage day in and day out and you can see why Lima Madsen owners consistently net greater profits on all types of jobs.

There's a size and model, portable or stationary, to meet every asphalt mixing need; capacities from 1000 to 10,000 lb. per batch. Why not ask your Lima Madsen distributor for more information or write us for free literature.

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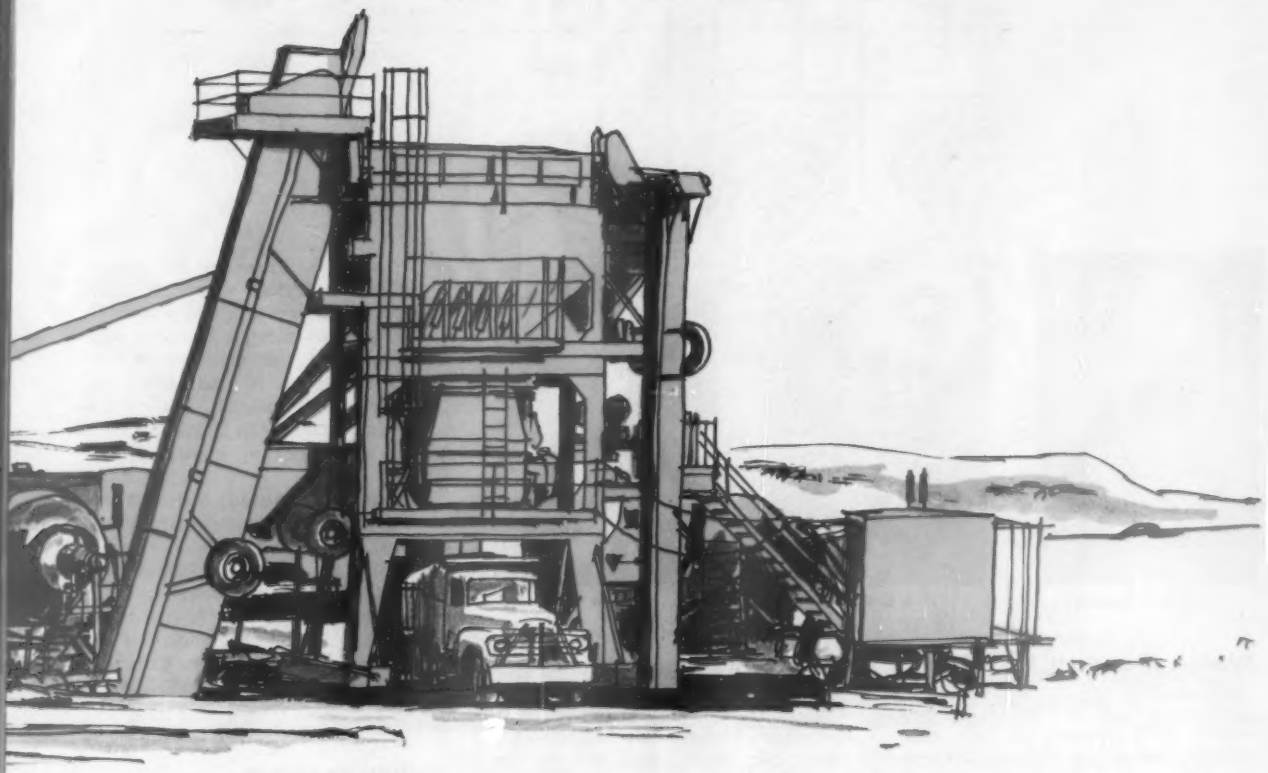
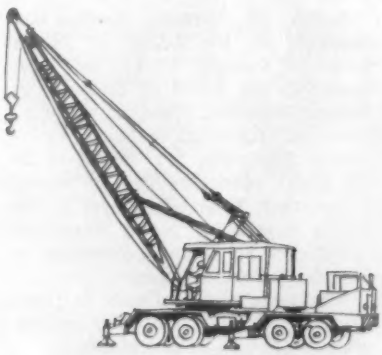
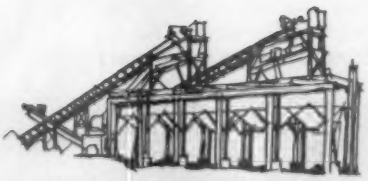
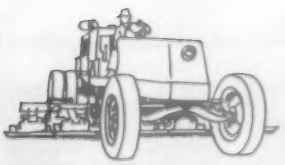




LIMA CRANES AND SHOVELS—Interchangeable front ends. Cranes to 140 tons—80 tons on rubber; shovels to 8 yd.; draglines variable.



LIMA AUSTIN-WESTERN portable and stationary crushing, screening and washing equipment. Simplified design, easy maintenance.



LIMA MODEL D ROADPACKER—Fast, deep vibratory compaction for single-course construction; available in Super model.

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PEOPLE IN THE NEWS

F. V. J. Haggerty

F. K. Wills

J. Zelek

Warner Company, Philadelphia, announces management changes

FRANCIS V. J. HAGGERTY has been elected vice president of sales, Construction Materials Division, Warner Co., Philadelphia, Pa. He was formerly general manager of the division. A graduate of the University of Delaware, Mr. Haggerty has been associated with Warner since 1934.

Franklin K. Wills, formerly resident manager of the Morrisville raw materials and processing operations, has been appointed general manager of operations, Construction Materials Division. Mr. Wills joined Warner Co. in 1922.

John Zelek, who has been general superintendent of the Van Sciver plant, becomes resident manager of the Morrisville area plants and operations. He joined the company in 1947 upon graduation from Pennsylvania State University.

Dravo Corporation appoints Keystone Division managers

E. R. Hyde

W. L. Price

A. T. Livingood

EDWARD R. HYDE has been appointed assistant general manager of the Keystone Division of Dravo Corp., Pittsburgh, Pa. A graduate of the University of Pittsburgh, Mr. Hyde joined Dravo in 1939. He served as manager of the division's south side plant for eight years before becoming appointed to Operations Manager in 1946.

William L. Price, who has been manager of engineering and materials for the past 16 months, succeeds Mr. Hyde as operations manager of the Keystone Division. A graduate of the University of Pittsburgh, Mr. Price became associated with Dravo in 1939, serving as engineering manager from 1951 to 1959.

Arthur T. Livingood, materials supervisor, has been named distribution manager. He attended West Virginia University and Carnegie Institute of Technology and joined Dravo in 1947 as a materials inspector. He is a member of the Concrete Specifications Institute and chairman of its Concrete Committee.

Marquette names new directors

ALBERT M. ANDREAS, director and chairman of the board of North American Cement Corp., has been named to the board of directors of Marquette Cement Manufacturing Co., following acquisition of North American by Marquette. Also elected to the Marquette board are Jansen Noyes, Sr., partner, Hemphill, Noyes & Co. and a director of North American; and Henry L. Hillman, president of Pittsburgh Coke & Chemical Co.

Perry Andreas continues as president and coordinator of sales and operations for the eastern plants.

Gravel Association elects new officers

JACKSON F. REIF, secretary-treasurer of the Ozaukee Sand & Gravel Co., Milwaukee, Wis., has been elected the first president of the newly organized Greater Milwaukee Gravel Producers Association. John Babich, Hales Corners Sand & Gravel Co., has been named vice president, and Wilbert Frenz, Ernst Sand & Gravel Co., secretary-treasurer.

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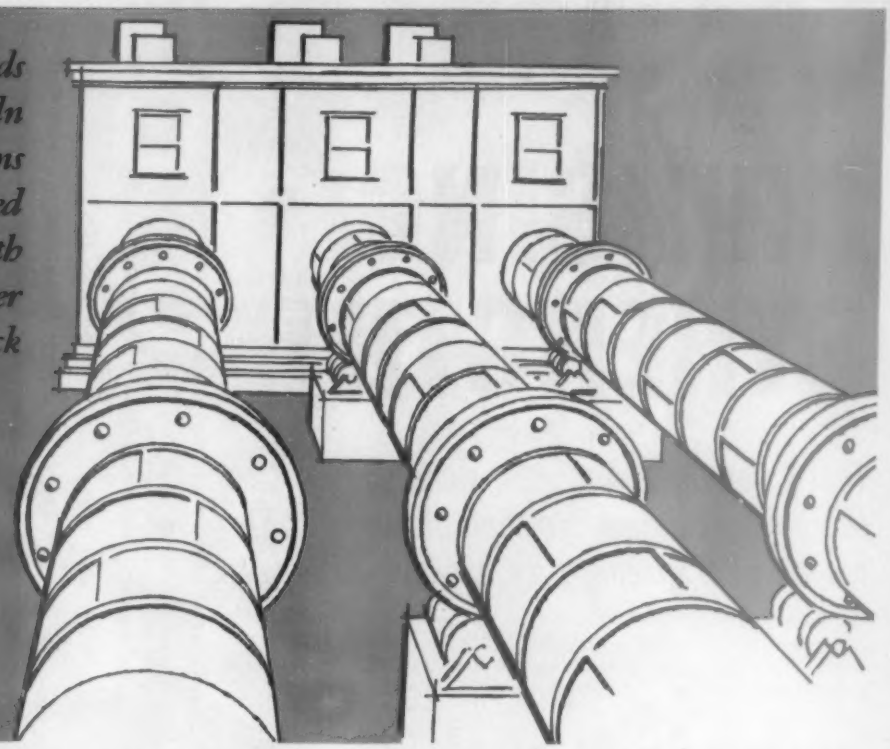
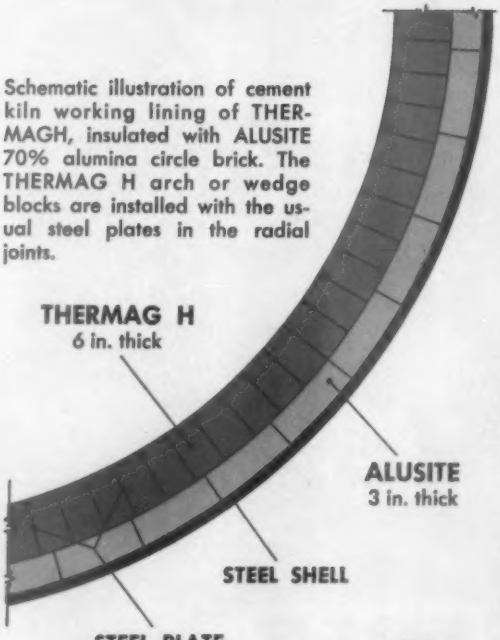
Brands Cement kiln lining problems can be solved with Harbison-Walker Basic Brick



THERMAG-H



Schematic illustration of cement kiln working lining of THERMAGH, insulated with ALUSITE 70% alumina circle brick. The THERMAG H arch or wedge blocks are installed with the usual steel plates in the radial joints.

Whatever may be the normal burning zone lining life, established as months or even a year and longer there remains the incentive to prolong the service and increase efficiency. The high temperature zone generally is the most vulnerable and radiates most lost heat. The many operating variables necessitate the use of the particular types of basic refractories best adapted for a given set of conditions in order to assure best economy. For the development of a protective and insulating coating of optimum thickness, the basic composition and softening point need to be compatible with these properties of the cement clinker produced.

Among the various different classes of Harbison-Walker basic refractories regularly used with good economy in rotary kiln linings, THERMAG H (formerly H-W 6-57) merits special consideration for unusually severe conditions. This duo-spinel bonded basic refractory of very hard burn is solving some difficult service life problems. In some kilns which are operated at exceedingly high temperatures, linings of this brand are insulated with ALUSITE 70% alumina brick and service is not impaired. The refractoriness of THERMAG H is adequate for maintaining a moderate coating which also adds to the overall insulation.

For conditions under which lining life at best is short, this unusual basic refractory warrants your investigation.

Harbison-Walker Refractories Company
And Subsidiaries
General Offices: Pittsburgh 22, Penna.
World's Most Complete Refractories Service

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"High capacity...
low maintenance...

BRUISING STRENGTH!"

That's how B. L. Anderson sums up the dependable performance of his 5 Link-Belt Speeder rock shovels

Not too long ago we looked in on one of the midwest's most progressive quarry operators. Purpose of the visit? Ask B. L. Anderson how his year-old Link-Belt Speeder LS-98 one-yard rock shovels are doing in his multiple quarry operation in Iowa.

WHAT ABOUT CAPACITY?

"We're getting more than we expected. We're surprised at their high capacity. We lean strong to a two-shovel operation — one on each side of the crusher. We're now feeding about 300 tons an hour with the Link-Belts . . . could load up to 4,000 tons a day.

"Those Speed-o-Matic power-hydraulic controls give our production a shot in the arm. They're a lot easier to handle . . . they keep our operators fresh. I don't know how other companies can go on making the old type."

WHAT ABOUT MAINTENANCE?

"We're happy with the low maintenance. The heavy dust doesn't bother the clutches. Our operators spend very little time adjusting the clutches.

"These rigs are built to take a pounding. Before we got our Link-Belts we used to come in for repairs at the end of the year. We won't be coming in this year!"

WHAT ABOUT POWER?

"Plenty of that! Our engines are equipped with hydraulic couplings for better shock absorption. Even with the heaviest loads we don't stand the rigs on end."

No matter where we go, who we ask, the answer is the same: "Link-Belt Speeder rock shovels give you peak capacity and profits, less trouble." See your Link-Belt Speeder distributor for full details. Or write Link-Belt Speeder Corporation, Cedar Rapids, Iowa. 105-61N

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it's time to compare . . . with Link-Belt Speeder

1936
1961
25 years
of controls
leadership
LINK-BELT

11000 and 10000 JOIN THE A-C TEAM OF MODERN DIESEL

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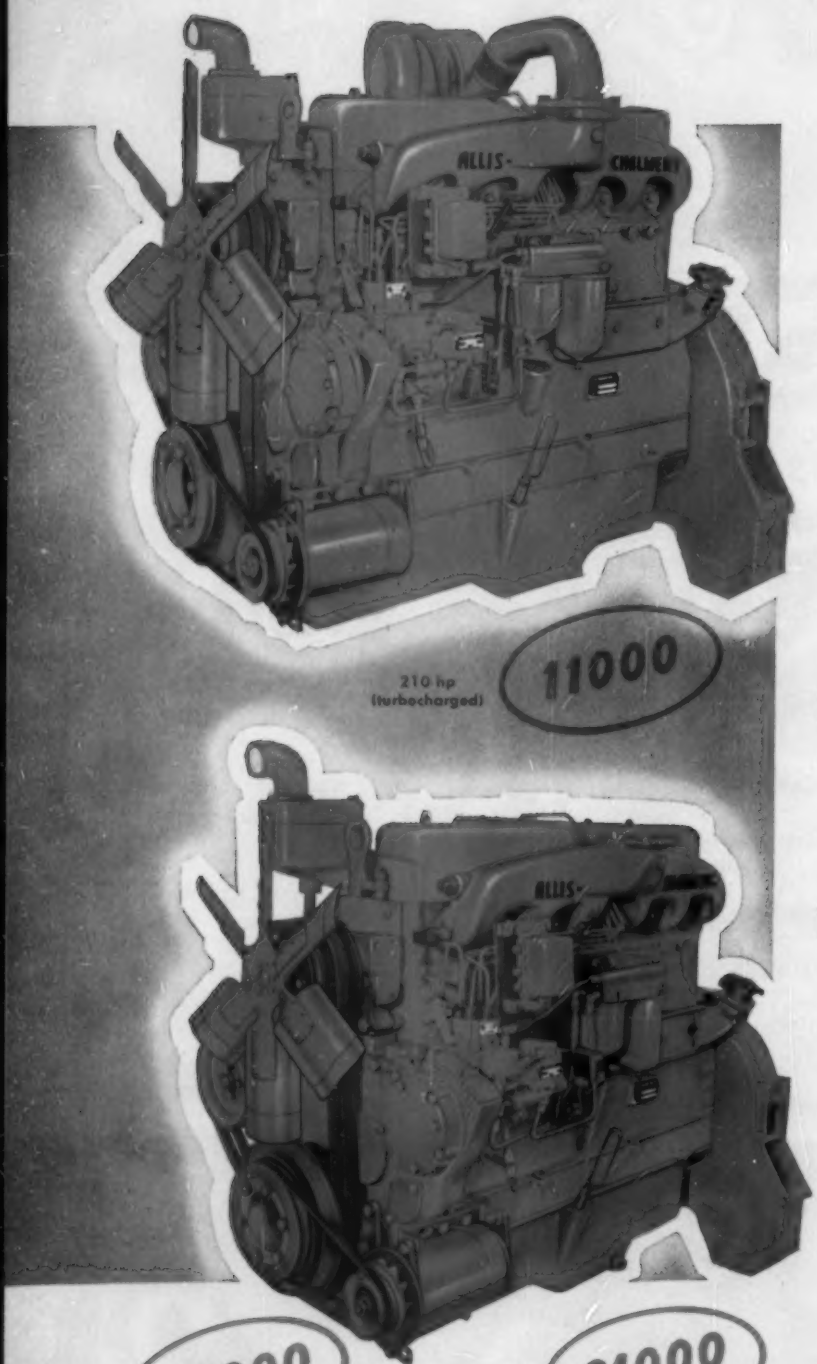

Now there are four of a NEW kind designed to give you...

LIGHT APPETITE FOR FUEL

Controlled turbulence mixes fuel and air thoroughly. Assures complete combustion — fuel savings to 27% and more!

"This new engine is not only doing the work of the larger engine it replaced, but is saving 30% and more on fuel!"

HIGH, SUSTAINED TORQUE — RAPID RESPONSE

You have **work power** that hangs on to overloads over the entire speed range.

"Amazingly rapid response under heavy loads."

CLEANLINESS IN DESIGN AND OPERATION

Efficient combustion converts fuel to **work power,** not smoke. There is no excess "plumbing" to invite service problems.

"Their clean, simple design makes them easy to service. To our knowledge, they are the best buy in a diesel engine for rough work today!"

FAST STARTING

These engines start "right now" directly on diesel fuel. No ether, no pre-heating, no long work-robbing warm-ups even in freezing temperatures.

"Starting is excellent, even in the 0 to 10° range which we have fairly often here."

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Find out how profitably this new kind of **work power** can serve you. See your Allis-Chalmers dealer or write for free bulletins — BU-718 on the 11000 and 10000; BU-540 on the 21000 and 16000. Allis-Chalmers, Milwaukee 1, Wisconsin.

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PEOPLE IN THE NEWS

continued from page 46

Riverside Cement personnel changes

GEOFFREY FROHNSDORFF, formerly associated with the Defense Research Board of the Royal Military College in Kingston, Ontario, Canada, has been named research chemist of the research and development department of Riverside Cement Co. He is a graduate of St. Andrews University in Scotland, Imperial College of London and Lehigh Univ. in Pennsylvania.

John M. Mason has been appointed research engineer and placed in charge of process and engineering research activities of the department.

C. Taylor Test, as applications and research engineer, will be responsible for all areas involving concrete and mortar application research and testing programs of the department.

Other personnel changes have been in the sales and marketing research field of Riverside Cement Co. Bill Imholt, for a number of years a salesman in the central coast area, has been appointed assistant director of marketing research. Paul Johnson, formerly assistant to the plant superintendent at Oro Grande, before transferring to sales early in 1959, has been made sales manager.

E. L. Aussieker elected president of MLPA

E. L. AUSSIEKER of Auxvasse Stone and Gravel Co., Auxvasse, Mo., was elected president of the Missouri Limestone Producers Association at its recent meeting. Mr. Aussieker served previously as vice president and secretary-treasurer of the Association.

Other officers and directors elected are: R. W. Cullor, Cullor Limestone Co., Fort Scott, Kan., vice president; John Griesemer, Griesemer Stone Co., Springfield, Mo., secretary-treasurer; E. W. Hillenkamp, O'Fallon Quarry & Supply Co., O'Fallon, Mo., and Robert Trager, Trager Quarries, Inc., Chillicothe, Mo., directors.

Adolph Adrian, Adrian Materials Co. and president of MLPA in 1960, was renamed to the board for a three-year term, and N. A. McDonald was re-elected executive manager.

Retiring members of the board are: Charles Krause, Jr., Columbia Quarry Co., St. Louis, Mo., and Charles Hayes, L. W. Hayes, Inc., Kansas City, Mo.

Please turn to page 52

Check the Advantages of Dynaclone® Dust Filters

SINCE 1924 SLY

1930's
SLY TUBE-TYPE FILTER
Dust load was concentrated at certain points, causing premature tube failure.
TODAY
SLY "ROLL-CLEAN" DYNACLONE:
Dust is spread evenly over the entire cloth area.

2 TO 3 TIMES LONGER FILTER BAG LIFE

Three factors play a part in longer Dynaclone filter bag life — as proved on the most demanding applications. (1) Dynaclone construction and low air-velocity design insure even distribution of dust. (2) "Resist-O-Wear" bags have 3-section design for greater basic bag strength. (3) Dust is removed from bags by reverse cleaning air. No shaking — no abrasion.

There are other reasons why the "Roll-Clean" Dynaclone sets an unmatched performance pace. Flat bag design means 20 to 40% more cloth in a given space — greater capacity per cubic foot of filter. The Dynaclone is automatically self-cleaning. It operates continuously, provides constant uniform suction at dust sources for complete collection.

Check *all* the Dynaclone advantages . . . *Send for 36-Page Catalog 104.*

"Roll-Clean" Dynaclone: Patents 2,867,289, 2,938,598. "Resist-O-Wear" Filter Bags: Patent 2,959,247.

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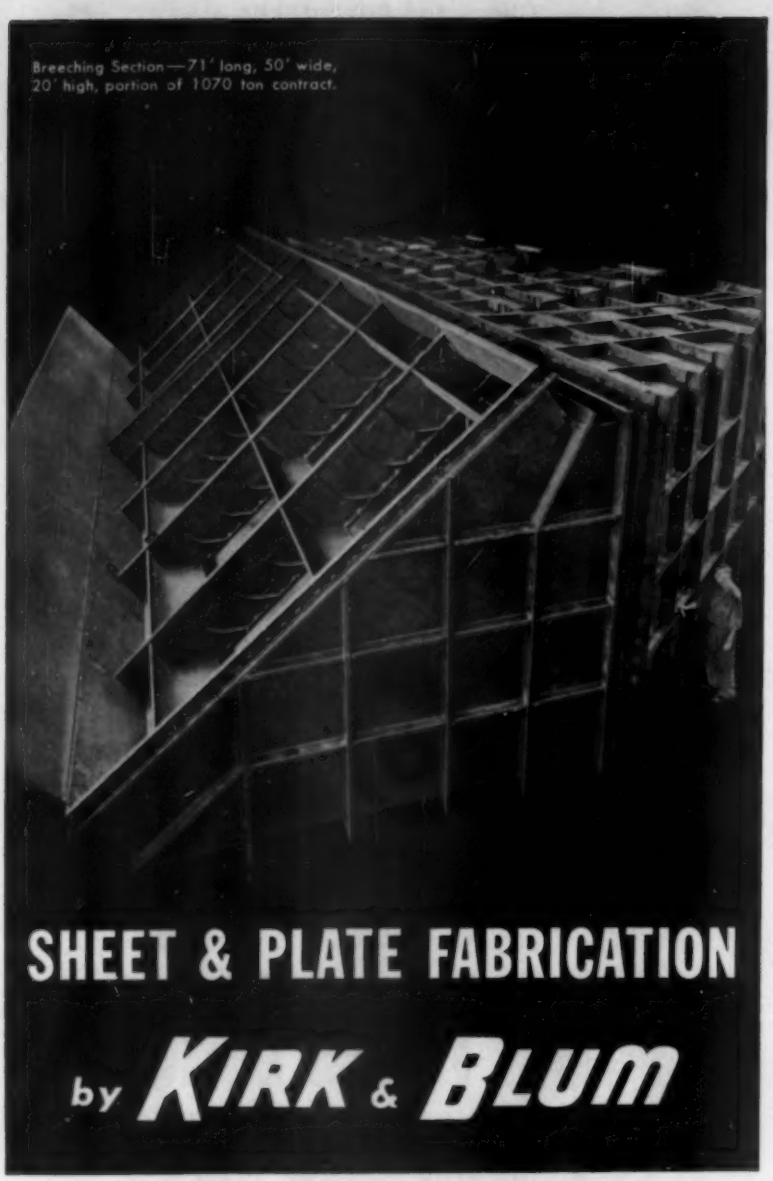

Why can Kirk & Blum save you time and money on huge fabrications? Extensive facilities and equipment of a 170,000 sq. ft. plant enable experienced K & B craftsmen to utilize their production ingenuity to the fullest.

Heavy assemblies, up to ½" thickness are produced, pre-assembled and loaded for shipping in a 50' x 480' bay with overhead handling capacity up to 25 tons.

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BINS • HOPPERS • INSULATION JACKETING • CONTROL PANELS & DESKS

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PEOPLE IN THE NEWS

continued from page 51

Union Rock promotions

NORMAN HOFF, sales manager, has been named vice president and general manager of Union Rock & Materials Co., Phoenix, Ariz., an affiliate of Bentson Contracting Co. A graduate of Arizona State University, Mr. Hoff joined Union Rock as a dispatcher in 1953. He is a member of the Arizona Aggregate Association and a member of the board of the Arizona Masonry Guild.

John Newell succeeds Mr. Hoff as sales manager. A graduate of Arizona State University, he joined Union Rock in 1952 as a dispatcher.

Phillip Williams, plant superintendent, has been appointed general superintendent of plants, equipment and maintenance. He has been associated with Union Rock since 1950.

Lewis F. Phillips, who has been manager of Bentson Contracting Co. since 1956, has been named vice president and general manager of Bentson. He joined the firm in 1951.

IMCC appoints Florida phosphate managers

COLIN A. CAMPBELL has been named manager of the Bartow, Fla., phosphate plant of International Minerals and Chemical Corp., Skokie, Ill., succeeding James L. Cox who has been appointed manager of the company's $5 million plant expansion program at the Noralyn and Achan, Fla., mines. A graduate of the Michigan College of Mining and Technology, Mr. Campbell was formerly with Calumet and Hecla., Inc., Calumet, Mich., directing its mining activities for 11 years.

NLI director retires

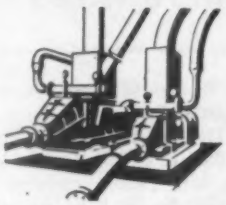
GEORGE S. HARVEY has retired as a director of the National Limestone Institute. Mr. Harvey, who is associated with the multiwall bag division of Owens-Illinois Glass Co., has long been active in the Manufacturers' Division of NLI, and was awarded a plaque at the Institute's recent convention for service as 1958 chairman of the Manufacturers' Division.

Frank M. Cannon has replaced Mr. Harvey on the NLI Manufacturers' Division board. He is eastern regional salesman for the multiwall bag division of Owens-Illinois Glass Co.

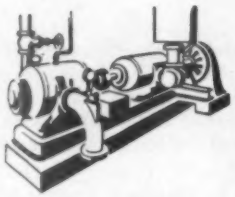
Please turn to page 54

FULLER EQUIPMENT

for the process industries

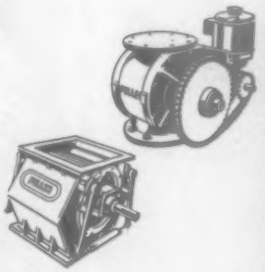


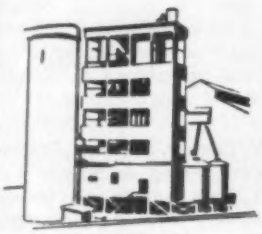
Pneumatic Materials Handling Systems. Widely specified throughout the process industries, Fuller's range of equipment offers best single source for solving problems in moving dry bulk materials pneumatically. Fuller-Kinyon Pumping Systems, Airveyor® Pressure and Vacuum Conveying Systems, and F-H Airslide® Fluidizing Conveyors are completely sealed to prevent both contamination of the product and any leakage of dust, etc., into the surrounding area. They are used to move dry, granular and pulverized materials to and from cars, ships, trailers, storage and processing points.



Fuller Rotary Compressors and Vacuum Pumps are vibration-free, can be installed anywhere, even on balconies. Fewer moving parts mean minimum maintenance. Compressors and Vacuum Pumps handle air and gases from 30 to 3300 cfm at pressures to 125 lb. gage. Vacuums to 29.95 in. (referred to 30-in. barometer).

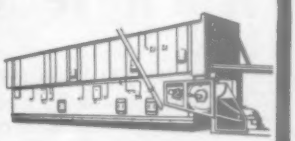
Fuller Vane-type and Roll Feeders . . . for volumetrically controlled feeding of a wide range of dry pulverized or granular materials. Also Fuller Rotary Valves . . . used under silo deck slabs and bins to permit the free flow of pulverized materials which tend to arch, such as lime and cement raw materials.





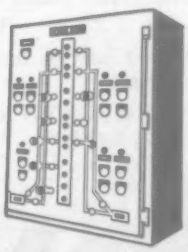
Fuller Preheaters, Humboldt Suspension Type . . . for preheating dry, pulverized Portland cement raw materials with rotary kiln waste gases.

Fuller Horizontal and Inclined Grate Coolers are compact, easily installed for fast, efficient cooling of materials such as nodulized phosphate rock, pebble lime, ores, dolomite, iron nodules and Portland cement clinker from 2800°F. or higher to any desired point within a reasonable range of atmospheric temperature.



Fuller-Material-Level Indicators signal audibly and visibly when materials reach a predetermined high or low level. Controls conveyor motors, valve circuits, etc.

Fuller Control Panels permit automatic, remote, one-man control of multiple operations. Easily-read panel permits visualizing flow of material to storage or from process bins.



Fuller equipment is designed to help give you maximum efficiency at minimum cost. Send today for more detailed literature.

1356
G-210

See Chemical Engineering Catalog for details and specifications

FULLER COMPANY
102 Bridge St., Catasauqua, Pa.
Subsidiary of General American Transportation Corporation
Offices in Principal Cities Throughout the World

Fuller
. . . . pioneers in harnessing AIR

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Will Never Owe You Anything!

Your OWEN Clamshell Bucket starts making money for you from the first hefty mouthful it bites off . . . and keeps on making money because its rugged construction "stands up". It's the bucket with "The Big Bite that's Just Right!"

The OWEN has a strong appetite for work—an appetite that is never satisfied. These are exclusive features that keep it working for you:

Block and Tackle Type Reeving — **Recessed Lips**
One-piece Head Construction — **Single Main Shaft**
Riveted Bowl Assembly

Prompt service through ample inventory on new equipment and parts.

Write for OWEN information on how these features can make money for you.

The OWEN
BUCKET COMPANY
BREAKWATER AVENUE • CLEVELAND 2, OHIO
BRANCH OFFICES: New York • Philadelphia • Chicago • Berkeley, California • Fort Lauderdale, Florida
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PEOPLE IN THE NEWS

continued from page 52

OBITUARIES

William B. Cheek, former manager of the Western Portland Cement Association, Denver, Colo., died February 20 at the age of 73. Born in Danville, Ky., Mr. Cheek attended Tri-State College. In 1918 he moved to Fort Collins, Colo., where he served as city engineer. Subsequently, he was associated with Monolith Portland Cement Co., and later was president and general manager of Vol-Scor Aggregate Co.

Jap F. McKee, superintendent of the Herzog Lime & Stone Co., Forest, Ohio, died suddenly on March 10. He was 59 years of age and had been associated with the company since 1924.

Francis A. McAdam, director of research and development for Huron Portland Cement Co., Detroit, Mich., died February 12 after an illness of three weeks. He was 58 years of age. A native of Newport, R.I., Mr. McAdam was a member of the American Concrete Institute, American Society for Testing Materials, and the American Mining Congress. He had been research and development director since 1954.

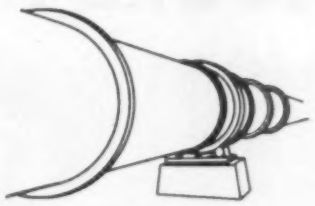
Fred W. Cramer, Jr., vice president of the York Stone & Supply Co., York, Pa., was among six persons killed February 2 in a train wreck near Baltimore, Md. He was 49 years of age.

Charles H. Breerwood, a pioneer in the cement industry, died January 22. He was 80 years of age. Mr. Breerwood formerly was president of the Separation Process Co., vice president of Allentown Portland Cement Co., Catasauqua, Pa., and vice president and general manager of the Valley Forge Cement Co., Conshohocken, Pa. During his association with Valley Forge, Mr. Breerwood in 1934 developed and patented the Breerwood minerals separation process, a method of separating and recombining the mineral constituents of sedimentary rocks used to make portland cement. At the time a complete minerals separation plant was in operation at the Valley Forge plant, treating the entire output of the tube mills.

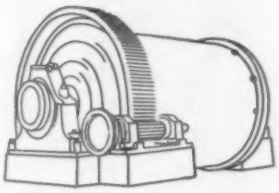
END

TRAYLOR EQUIPMENT

for the mining and process industries

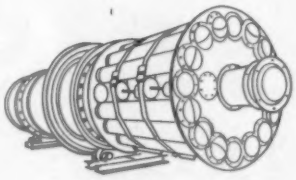


TRAYLOR ROTARY KILNS AND SLAKERS . . . the excellence of design and engineering of Traylor kilns is a result of over 58 years' experience in the manufacture of specialized machinery for the mining and process industries. Kiln shells are automatically welded of heavy steel plate. Alignment is maintained by easily adjusted supports. Full-floating type riding rings are of forged or cast steel, mounted on machined pads. Steel main gears and pinions are machined on a special gear generator. Kilns are designed and engineered to meet your specifications. Traylor has the most extensive research facility now available in the industry to insure delivery of process-perfected equipment to you.

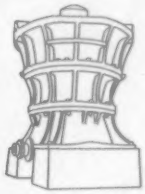


TRAYLOR BALL AND COMPARTMENT MILLS . . . **BALL MILLS** in both overflow and diaphram discharge types have shells of welded steel with detachable heads of cast steel.

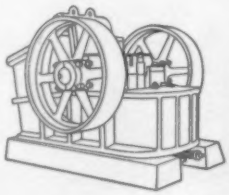
COMPARTMENT MILLS . . . partitioned by slotted diaphrams, these mills allow progressive reduction of product as it passes through different grades of grinding media within the mill, thereby reducing the amount of handling necessary in product reduction.



TRAYLOR COOLERS AND DRYERS . . . manufactured in diaphram and multiple tube design, receive the same care in design and construction as Traylor kilns. Dryers are either air cooled or water cooled or both and are available with direct or indirect firing, designed to your capacities or specification.



TRAYLOR GYRATORY CRUSHERS . . . Traylor is world famous as the manufacturer of giant 60″ gyratory crushers, secondary reduction crushers and fine reduction crushers. Crushers are designed with Traylor's original non-choking, self-tightening bell heads and curved concaves for large tonnage of small product and uniform size with a low percentage of waste and fines. Power applied as a direct crushing force offers greatly reduced power requirements at every setting.



TRAYLOR JAW CRUSHERS . . . feature the original curved jaw plates for greater capacities at finer settings and longer life of the wearing plates. The swing jaw is made of cast steel of extra heavy design and the pitman shaft is of annealed open hearth forged steel, for lightness with great strength. Maintainence and inspection are simplified by the design which makes all parts readily accessible.

TRAYLOR SLURRY FEEDERS AND TABLE FEEDERS . . . **SLURRY FEEDERS** are self contained, fully closed ferris wheel type feeders . . . accurately supply a constant volume of slurry to kilns and mills. Single welded tank and hopper units are available in sizes from 36″ to 84″.

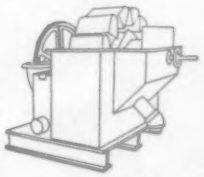
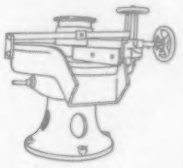


TABLE FEEDERS . . . accurately regulate the flow of material to mills, kilns and dryers. The revolving table receives material at its center from an adjustable feed spout. Feeders available from 2′ to 10′ in diameter.



See Chemical Engineering Catalog for details and specifications.

TRAYLOR ENGINEERING & MANUFACTURING

DIVISION OF FULLER COMPANY

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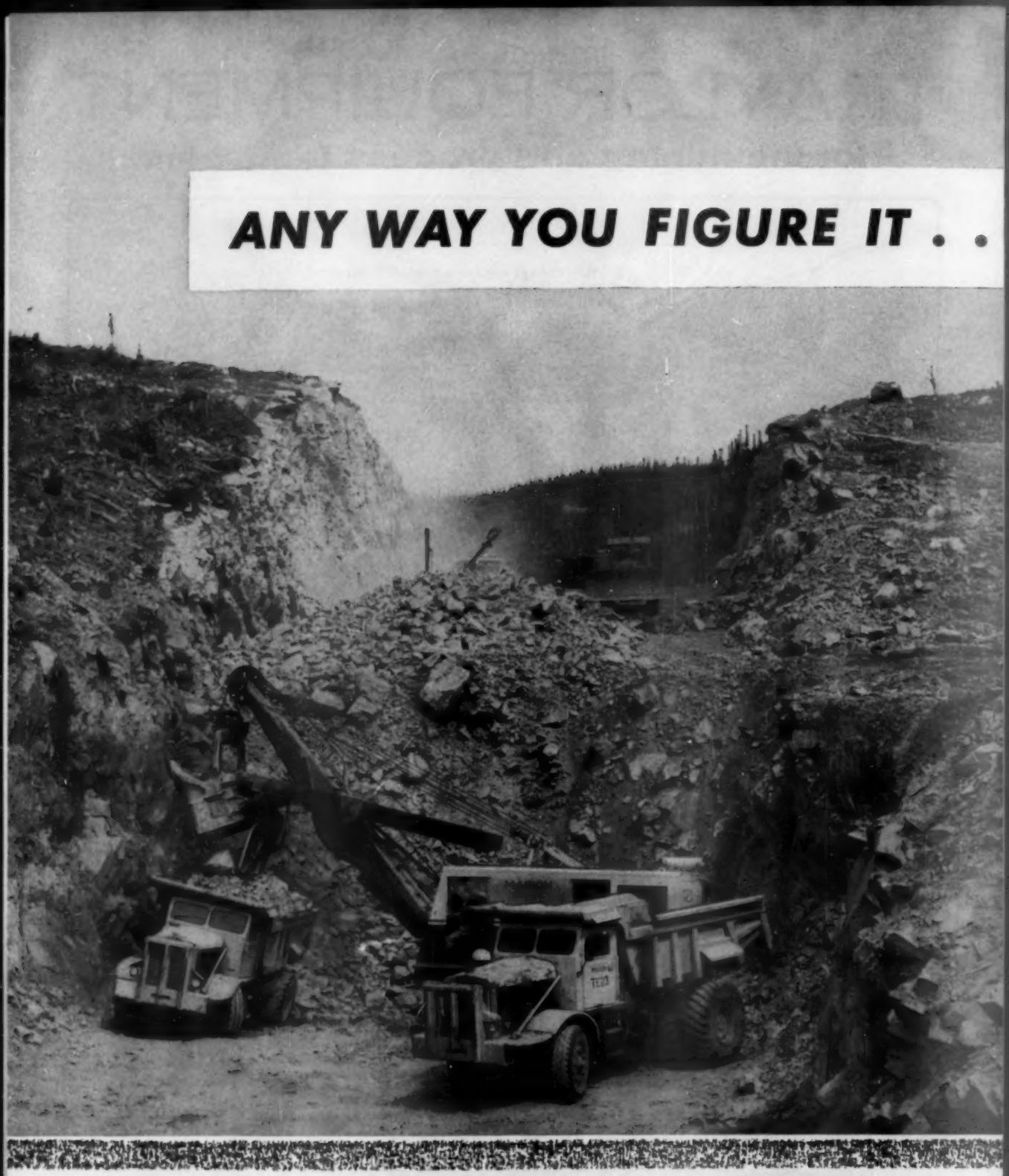
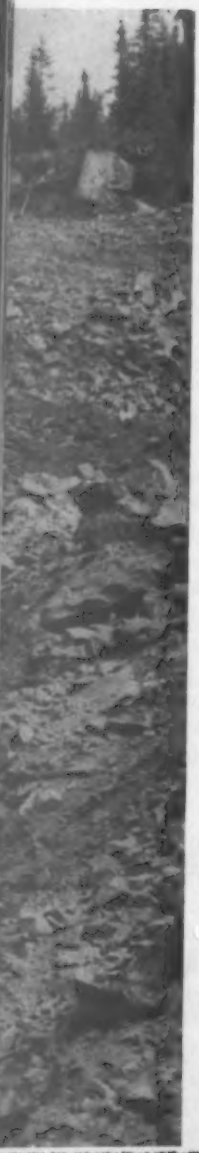


GM GENERAL MOTORS EUCLID

EUCLID

FOR MOVING EARTH, ROCK, COAL AND ORE

. . "Euc" Rear-Dumps are your best investment



Reliable job-proved performance, backed by competent and well stocked dealer parts and service facilities, makes "Euc" Rear-Dumps your best bet for top production at lowest over-all cost.

There are lots of ways to compare hauling equipment but no matter what method you use there's only one real measure — reliable performance on the job.

For over 25 years Euclid Rear-Dumps have been the outstanding choice of contractors, mines, quarries and industrial users of off-highway haulers. More than half of the orders for new "Eucs" are from previous owners — repeat business that is the best evidence of customer satisfaction with the product and the service available from Euclid dealers.

With this unequalled field experience and continuous product improvement, "Eucs" give you operating advantages that cut downtime and provide greater work-ability. An experienced dealer organization with complete parts stocks and service facilities is further assurance that your "Eucs" can always be kept in top shape wherever they may be working.

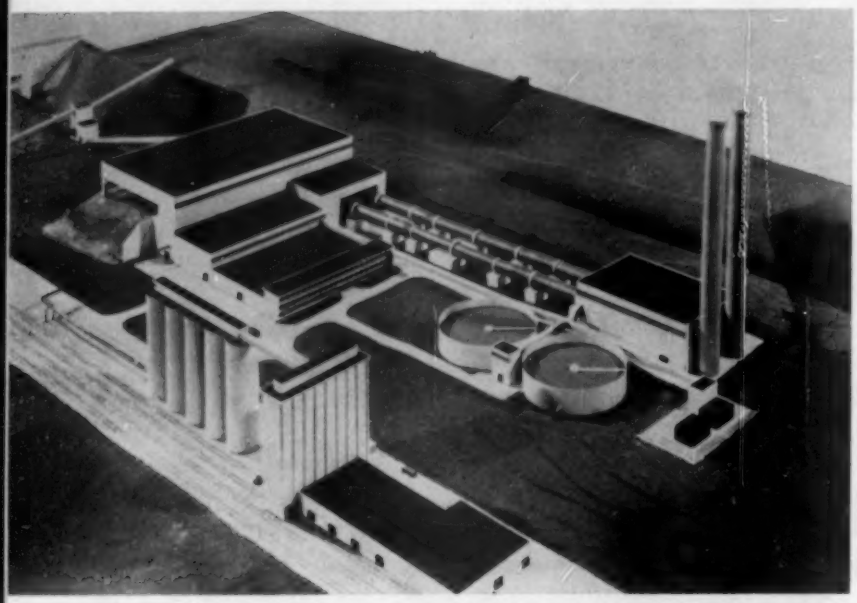
You can depend on "Eucs" and your Euclid dealer for bonus benefits that don't show in the specs but are mighty important in making Euclids your best investment.

EUCLID Division of General Motors, Cleveland 17, Ohio

Plants at Cleveland and Hudson, Ohio and Lanarkshire, Scotland

Euclid pioneered many of the rear-dump features that are "standard" today . . . free floating springs, planetary type final drive, exhaust heated bodies, Torqmatic Drive with torque converter and semi-automatic transmission, double acting hoist and other engineering advances that cut hauling costs.

INDUSTRY NEWS



The fine new plant which will begin operation in 1963 for Atlantic Cement Co., Inc., is pictured in this preliminary model.

Mammoth cement plant to serve Atlantic Seaboard

Ravena, situated in New York's Hudson River Valley, will be the site of a $64 million cement plant which in two years plans to supply the eastern seaboard cement market, from Maine to Florida, via water.

Joining in this venture are Cerro Corp., headed by Robert P. Koenig, and Newmont Mining Corp., Plato Malozemoff, president. Each of the New York companies will own 45 percent of the stock, with the remaining 10 percent in the hands of outside interests.

The name of the new company is Atlantic Cement Co., Inc., and it will be headed by the Swiss expert responsible for the highly-automated Dundee Cement plant, Dr. Bernard Ulrich. Initial capacity of the plant will be over 10 million bbl. per year; however, this can ultimately be expanded to as many as 20 million bbl.

Limestone reserves capable of supplying a century of production are to be found on Atlantic's 2,000-acre site. A 3,000-ft. conveyor will carry stone to the plant, eliminating surface transportation costs, and another conveyor system—7,000 ft. long—will move the finished cement to shiploading facilities on the Hudson River. Ocean-going vessels will then transport it to distribution stations bordering the Atlantic Coast.

St. Lawrence Cement Co., Clarkson, Ontario, is providing engineering services for what will probably be one of the most progressive, as well as largest cement mills in North America.

Please turn to page 62

Cerro-Newmont cement plans arouse Marquette opposition

Plans for a $64 million cement plant at Ravena, N.Y., recently announced by Cerro Corp. and Newmont Mining Co., have given rise to a protesting report fired back by Marquette Cement Manufacturing Co. Excess capacity created by the new operation, according to Marquette, will lead to "an unrestrained competitive scramble for business . . . along with severely reduced prices." It feels that the markets in the Northeastern states will not increase nearly enough to suit the capacity, which will be boosted within the area to 78 million bbl. if the Ravena plans go through.

Marquette, which has two plants near the proposed site, and other producers in the area claimed to have operated at an average of 70 percent capacity throughout 1960. They are worried that the situation will become greatly aggravated.

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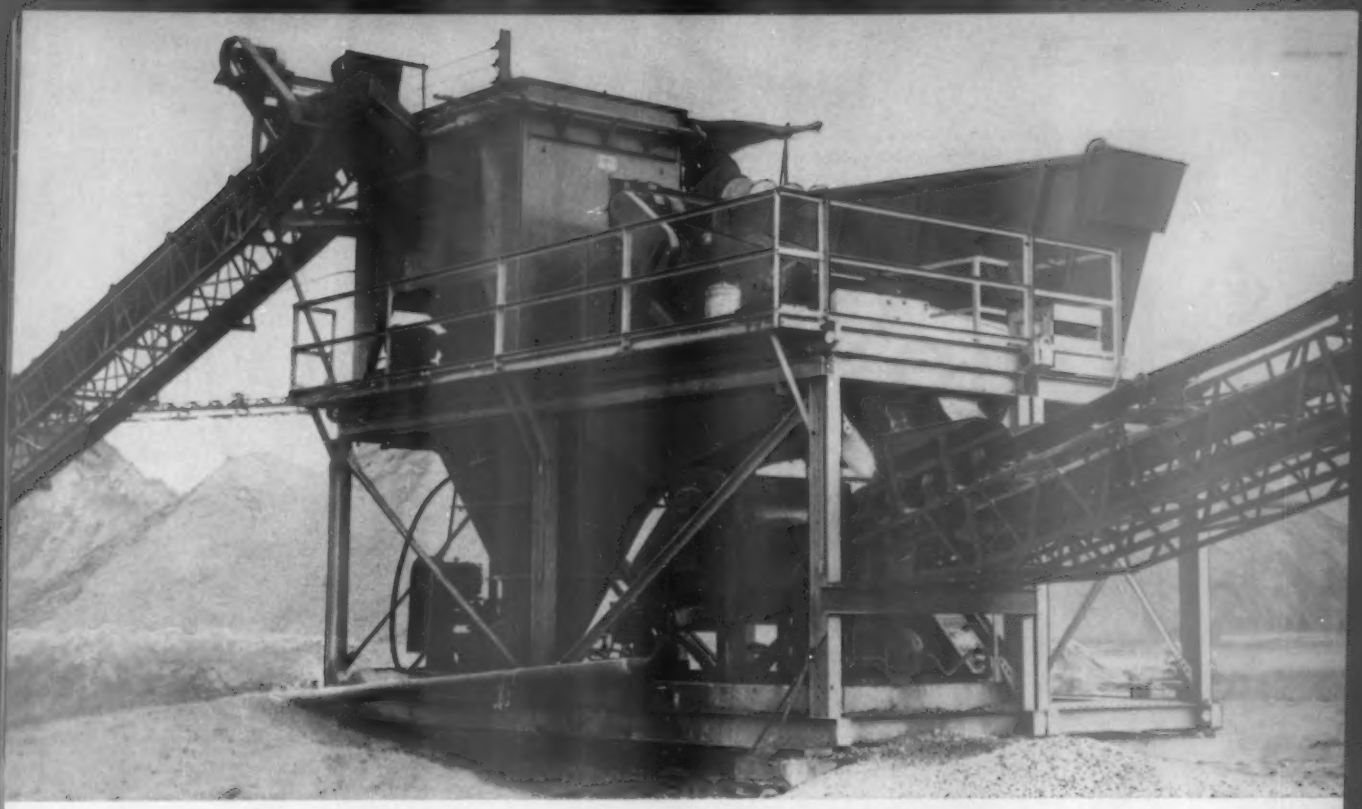

"OUR EAGLE HMS PLANT has solved our chert and soft stone problem"

GILLISSE CONSTRUCTION CO., GRAND RAPIDS, MICH.

To eliminate soft stone and chert from their class B material, to meet Michigan State Highway Dept. specifications, Gillisse Construction Co. uses an Eagle Heavy Media Separation Plant of 50-t.p.h. capacity. Ted Zeeff, Vice Pres., reports "It has solved our chert and soft stone problem. We are pleased with its efficiency and economy. The operator likes its ease of operation."

The Eagle HMS Plant is processing Michigan 6B material (⅜" to 1½") for bridge and overpass construction and 10B (⅜" to 1") for pre-stressed concrete bridge girders. This specification permits only 3% or less of deleterious material. Gravel treated by the Eagle HMS Plant readily meets specs. Sink or beneficiated material runs about 90% and float or rejected material runs about 10%. Rejected material is sold to secondary markets.

The highly efficient O.C.C. separatory vessel used in the Eagle plant will make a float-sink separation on materials with as little as 0.02 difference in specific gravity. If heavy media separation is the answer to your problem, this new high in separating efficiency allows the type of control needed to meet the really tough specification without unnecessary wastage of "good" material.

Gillisse Construction Company, successful aggregate producers for some years, also praises the splendid performance of their Eagle Coarse Material Screw Washer-Dewaterer which processes pea gravel (—⅜"), their Eagle Double Log Washer handling partially crushed gravel, and their Eagle Fine Material Double Screw Washer-Classifier-Dehydrator which handles concrete sand (2NS).

If soft stone or chert is hindering your sales an Eagle HMS Plant can solve your problem. Send a laboratory sample of your material for test—know why before you buy! Send for literature.

From the washing, screening plant in background, ⅜" to 1½" gravel is fed by dump truck to feeder and conveyor to the Eagle HMS Plant in foreground.

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FACTORY-TRAINED DISTRIBUTORS EVERYWHERE

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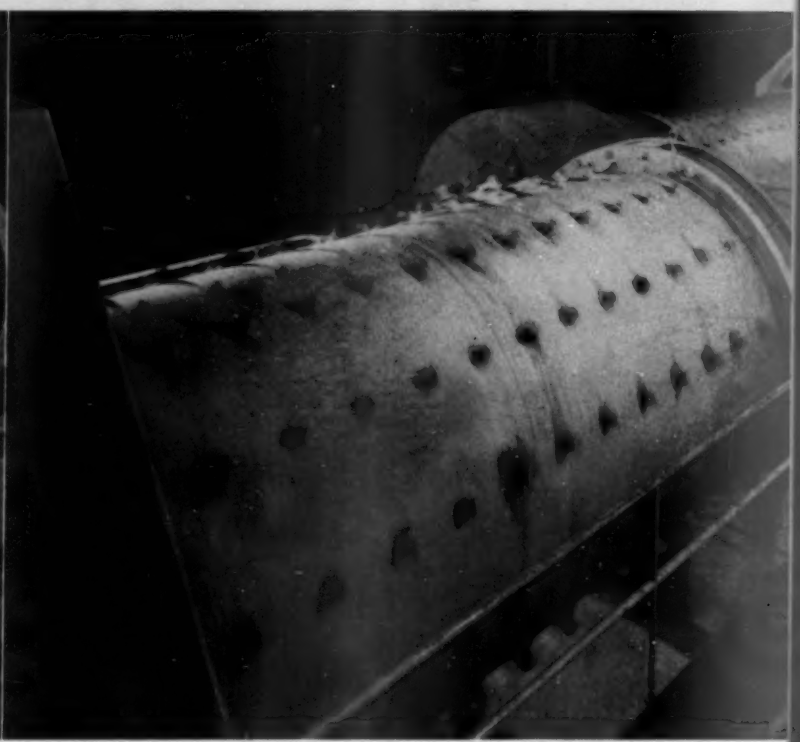


Low-Head screen with direct mounted motor: A completely integrated screening unit is this new, LOW-HEAD horizontal screen with direct mounted motor. No supporting structure, no belt tensioning or alignment problems plus headroom saving, smooth starts and stops, easy accessibility for maintenance. Another example of engineered screening from Allis-Chalmers.

Rod mills debut in cement "society": Two Allis-Chalmers overflow rod mills are being used by a Michigan cement company to wet grind cement raw materials in open circuit. Several other cement companies too are using them — all report substantial savings in labor and power requirements and a more uniform product. Biggest advantage of rod milling is preparation of sized feed for the tube mill, permitting the BALLPEB mill to grind satisfactory rotary kiln feed in open circuit.

Which of these productive ideas could be working for you?

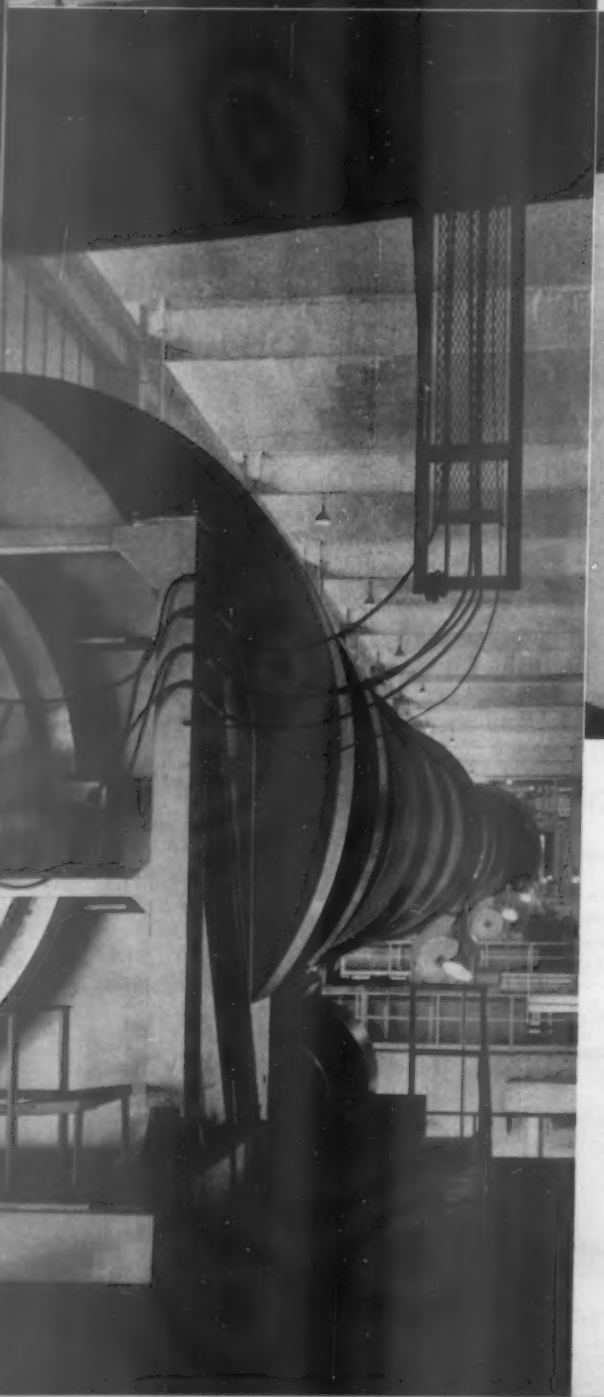
Screen with direct mounted motor. New ideas in kilns. Grinding mills that cut cement production costs. These examples demonstrate the extra value that is standard with A-C... the greater efficiency and the added productivity which are yours when you buy A-C products, systems and services. Call your Allis-Chalmers representative for details on A-C "worth-more" features. Or write Allis-Chalmers, Industries Group, Milwaukee 1, Wisconsin.

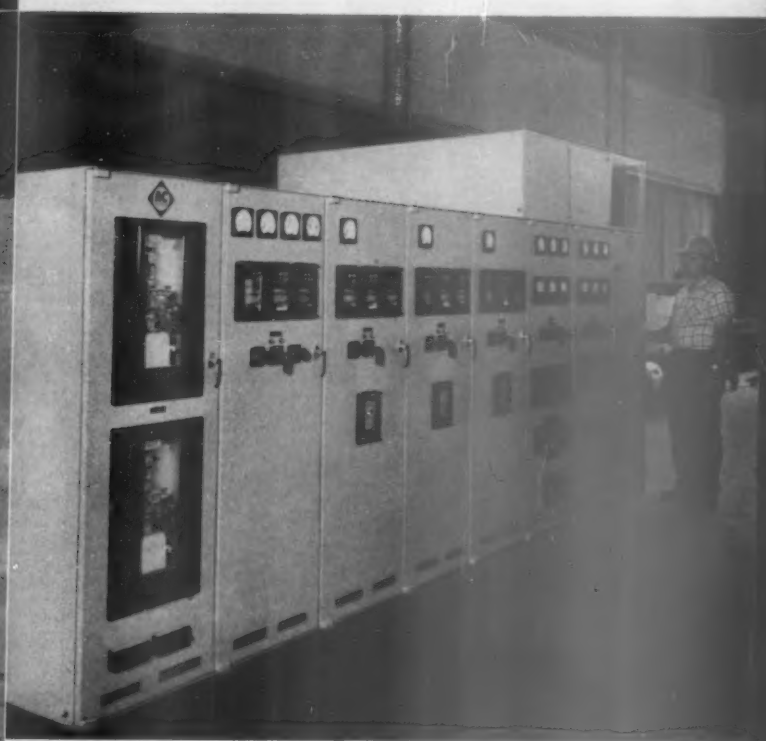
A-1482

Low-Head, Ballpeb and Chlorextol are Allis-Chalmers trademarks.

A-C transformer offers multiple benefits: Located close to the load center in a Midwest cement plant, this 5000-kva CHLOR-EXTOL filled transformer provides reduced power losses, better regulation, and flexibility for expansion. Types available also include oil-filled, liquid-filled, and dry-type units (both sealed and open).

Lowest height, easiest access — 5-kv metal-clad switchgear. Just 72 inches high . . . you get eye-level instrumentation, shoulder-height accessibility. Has front-accessible current transformers — maximum compartmentation and dead-front construction for greater safety. Choice of stored energy or solenoid operated circuit breakers.





New A-C kilns have many innovations: Latest A-C rotary kilns feature: expansion type ring gears, removable firing hood faces, hydraulic thrust mechanisms, dual drives to overcome critical speed vibrations and independent hydraulically adjustable carrying mechanisms to keep roller faces in proper contact with riding ring face. New ideas in kiln engineering mark each new kiln from A-C.

ALLIS-CHALMERS PRODUCTS: Look to Allis-Chalmers for compressors, controls, crushers, earth-moving equipment, electrical distribution equipment, engines, generators, industrial systems, kilns, lift trucks, mills, motors, pumps, rectifiers, screens; thermal, hydro and atomic electrical generating equipment; tractors, transformers, unit substations.

ALLIS-CHALMERS

continued from page 58

United States Gypsum's new mine and mill

The Governor of Iowa and more than a hundred civic leaders of eastern Iowa officially welcomed United States Gypsum Co. to the area March 30. Gov. Norman Erbe spoke at a luncheon in Burlington that preceded an inspection of the new mine and gypsum board plant at Sperry, Iowa. This plant taps an underground gypsum deposit and manufactures a line of wallboard and plaster. Over 100 employes will service the installation when it reaches full capacity.

Mineral rights on more than 4,000 acres should supply over a century's worth of raw materials at normal rates of mining. The gypsum is an 8 to 12-ft. seam about 600 ft. below the surface,

and will be mined by room and pillar methods. Gypsum will be calcined in three gas-fired kettles.

Representing the management of U. S. Gypsum on this occasion were Robert D. Stephan, vice president of sales, and Hugh Jones, plant manager of the Sperry plant. Also introduced at the gathering was Sidney Bartlett, Chicago, a former resident of Burlington and a 55-year veteran with the company before his retirement.

Proposed tax arouses Iowa limestone producers

At the March meeting of the Iowa Limestone Producers Association, efforts were organized to defeat a bill (S. F. 393) which would put a 5¢ tax on each ton of coal, limestone and gravel. Speaking for the Association, Executive Secretary Robert L. Miller opposed the routing of funds from the "already insufficient" highway fund into the school fund. He said that at present "about 90 percent of our crushed rock business is with tax-supported bodies like the state, county and cities."

Please turn to page 64

Plibrico research solves costly servicing problems

PLIBRICO "80" for extremely high temperatures ...2000-3300° F. Excellent acid and abrasion resistance. 80% alumina; 14% silica. Heat setting. Available with air bond for greater strength.

SUPER AIR BOND for severe high temperatures ...500-2800° F. with low-temperature bond. Good acid and abrasion resistance. 43½% alumina; 50% silica. Air and heat setting.

New plastic refractories take MORE PUNISHMENT in dryers, kilns, hoods, furnaces

These new refractories are designed especially to lower maintenance costs in cement, lime and gypsum plants. They form a continuous joint-free lining, even around contours, which prevents penetration of dust and chemicals which cause early deterioration. And you save the cost of special shapes.

Castable & Plastic Refractories, Ramming Mixes...for Drying, Processing & Calcining Furnaces.

WRITE FOR FREE LABORATORY REPORT giving technical data. Ask your Plibrico Field Engineer how you can save time and money with his 3-in-1 service.

Plibrico

PLIBRICO COMPANY

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Sales and Service Throughout the World

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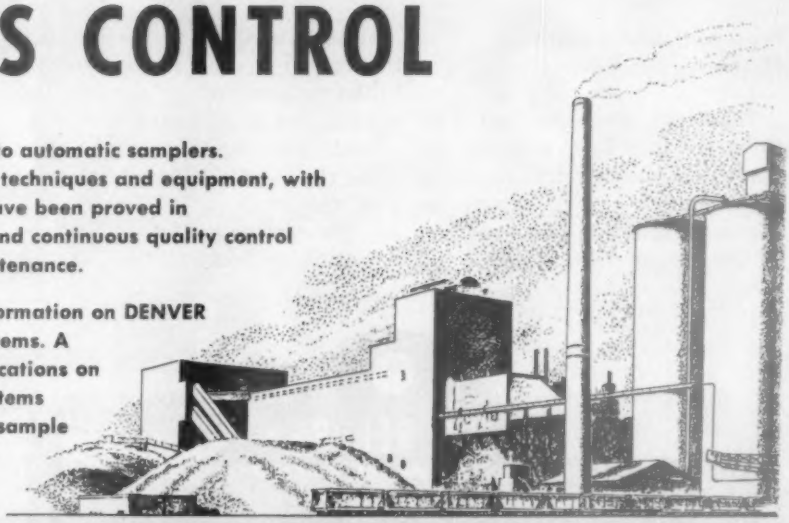
KEY to modern CEMENT PLANT OPERATION is

PROCESS CONTROL

...and the trend in process control is to automatic samplers. DENVER has set the pace in sampling techniques and equipment, with a full range of types and sizes that have been proved in cement plant operation for accurate and continuous quality control at a low cost and with minimum maintenance.

Write, wire or phone for complete information on DENVER Samplers...or complete sampling systems. A set of 15 layout drawings with specifications on individual samplers and sampling systems sent on request. Complete laboratory sample processing equipment also available. Many units in stock.



DENVER SAMPLERS for the Cement Industries

Simple — Low Cost — Accurate — Dependable

For Rock or Slurry Sampling...

DENVER Automatic Samplers

A compact unit designed to move the sample cutter through the stream at a uniform speed up to 30" per second to provide an accurate increment sample. Action of cutter and mechanism closely adheres to theoretical "perfect technique" in cutting a sample. High speed cutter travel eliminates need for secondary sampling. Units with cutter travel to 10' and longer. Dust-tight units and bottom dump cutters for use in restricted headroom areas available. Most models in stock for quick delivery.

For Dry Cement Sampling...

A self-contained, dust-tight unit designed to take increment samples from a vertical stream of dry materials at adjustable and predetermined intervals. Ideal for use with pneumatic conveying systems. Totally-enclosed, fabricated steel housing with seal between sample cutter and sample discharge chute to prevent loss or contamination by reject portion.

DENVER Automatic Vezin Samplers

DENVER EQUIPMENT COMPANY

1400 17th Street **Denver 17, Colorado** **Phone CHerry 4-4466**

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continued from page 62

President warns Federal Highway program is in peril

President Kennedy has told Congress that he is strongly opposed to either stretching out or cutting back the pay-as-you-go highway program. Construction of the system must progress full steam ahead, as a much-needed stimulus to employment and allied industries, as a reducing agent in the increasing traffic fatality rate, and as a time-saver for the rapidly-expanding hordes of motorists.

He recommended full authorization to complete the system by 1972, as established by past highway acts, and increasing the ABC System authorization $25 million every other year starting in 1964, until an annual appropriation of $1 billion is reached in 1968.

The President would like to retain the current 4¢ per gallon Federal gasoline tax and increase the following taxes: diesel fuel from 4 to 7¢ per gallon; trucks over 26,000 lb. from $1.50 to $5 per 1,000 lb.; highway tires from 8 to 10¢; inner tubes from 9 to 10¢, and tread rubber from 3 to 10¢ per lb. He is opposing the scheduled switching to the Highway Trust Fund of $800 million annually in highway user taxes beginning this July. He is asking Congress not to transfer aviation fuel tax to the Trust Fund, but to transfer to it the financing of forest and public land highways.

JOB REPORT

MOVING GRAVEL WITH A "U"

"On the job, the Balderson U-dozer will move 60% more material than the straight dozer, whether building roads, grading or feeding gravel conveyors. My U-dozer has moved 2,462 tons of gravel to charge the plant in an 8 hour shift with a 150 foot push. I like my Balderson U-dozer very much, and I am planning on buying another one. The U-dozer means more dollars at the end of each day."

Frank E. Gillespie
Gillespie Construction Co.
Reno, Nevada

BALDERSON INC.
WAMEGO KANSAS U. S. A.

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

Please send me more information on teaming Balderson blades with Caterpillar Traxcavators. I am mainly interested in a _____ (type) blade for a _____ (model) Caterpillar.

NAME _____
ADDRESS _____
CITY _____ STATE _____

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Floridans fete phosphate

Since last December thousands have toured the Phosphate Valley Exposition near Bartow, Fla. Displays showing the extensive history of phosphate in "Bone Valley" are designed to promote such Polk County attractions as Cypress Gardens, Bok Tower and Peace River Park.

In March, Florida Southern College, Lakeland, hosted the annual phosphate regional science fair. Pupils from all over Polk County entered scientific displays for exhibition and judging.

Early '61 paving awards

Here are the concrete paving awards made during the first two months of 1961:

	Sq. yd. awarded
Roads	11,016,020
Streets & alleys	3,781,455
Airports	1,183,130
Total	15,980,605

Please turn to page 69

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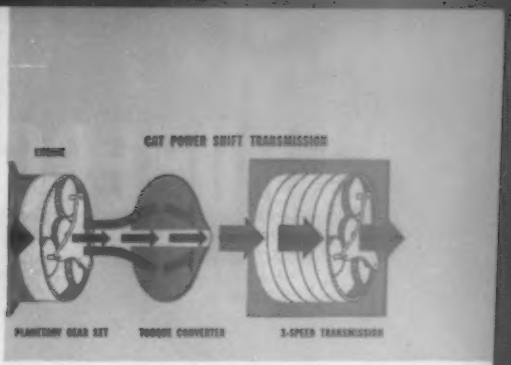

The exclusive Cat power shift transmission works like this: The engine drives planetary gears in the flywheel, where output torque is divided. Part of it is routed to the transmission through a torque converter (providing anti-stall and load-matching ability). Part goes direct to the three-speed transmission (provides economy and fast response of direct drive). It's one ton of muscle built with the precision of a fine watch.

WITH CAT POWER SHIFT TRANSMISSION IN A D8H, A MAN'S FINGER TIPS CAN CONTROL 30-50% MORE PRODUCTION

Your present equipment may move material at low cost—but here's one reason a D8 Series H Tractor may move it a lot cheaper.

It's the Caterpillar power shift transmission—the only transmission available that combines the advantages of direct drive, torque converter drive and power shifting in a single unit. It greatly increases operator efficiency—offers important new opportunities for broadening your profit margin.

Here's how this big step ahead in transmission design helps your operator get more work from the machine: A single selector lever replaces the familiar master clutch, gear change and forward-reverse levers. Using this single selector lever, the operator can shift on the go in a split-second even under full load. He changes speed or reverses direction with finger-tip ease . . . without clutching . . . without braking . . . without even lifting his arm from the arm rest. And the lever is mounted for left-hand control, leaving the right hand free for maneuvering the tractor or controlling the dozer, ripper or scraper. Convenience makes it easy to choose the right speed at the right moment.

Matching this ease of control are safety features you'll like. A safety lock in the selector housing holds a parked machine in neutral while the engine is running. Another safety device automatically shifts the selector lever to neutral when the engine is stopped.

The simplicity and safety of the Cat power shift transmission make your good operators even better and less experienced operators more effective. They can take greater advantage of the tractor's power and capacity to speed the work. And ease of operation keeps their efficiency high throughout the day.

Cat power shift transmission also means a big jump in your machine's efficiency too. You'll particularly notice the difference on jobs where frequent shifting is the rule—such applications as feeding a shovel or short-cycle dozing.

For instance, in dozing, the operator starts to pick up the load in second gear—then shifts on the go to first for full lug yardage. There's no clutching, no lost time or momentum when changing speeds. An easy move back to second drifts the material to its destination. Another move of the lever puts the machine in high-speed reverse for fast return to the digging area.

Machine efficiency is *always* high. Cat power shift transmission provides the needed power at the highest possible speed. Its exclusive torque divider design combines the snap and economy of direct drive with the load-matching ability and anti-stall characteristics of torque converter drive—and three forward-reverse speeds tailor it to the entire working range.

Just how much of an increase will the Cat power shift transmission make on your job? This will depend on your application. On short-cycle dozing, reports in our file show increases *as high as 50%* over similar-sized machines with other transmissions. Some users flatly state they will never buy another track-type machine in the 200 HP class unless it is a Cat power shift unit.

Power shift transmission is just one reason the D8H may be a far better profit tool than the machine you are now using. There are other features of this 235 HP turbocharged tractor that could be equally advantageous in your work. Your Caterpillar Dealer will welcome the opportunity to discuss the D8H in terms of your job and present facts and figures so you can determine true benefits. And if a demonstration with measured results would help, he will be glad to make arrangements.

Call him today.

Caterpillar Tractor Co., General Offices, Peoria, Illinois, U.S.A.

CATERPILLAR

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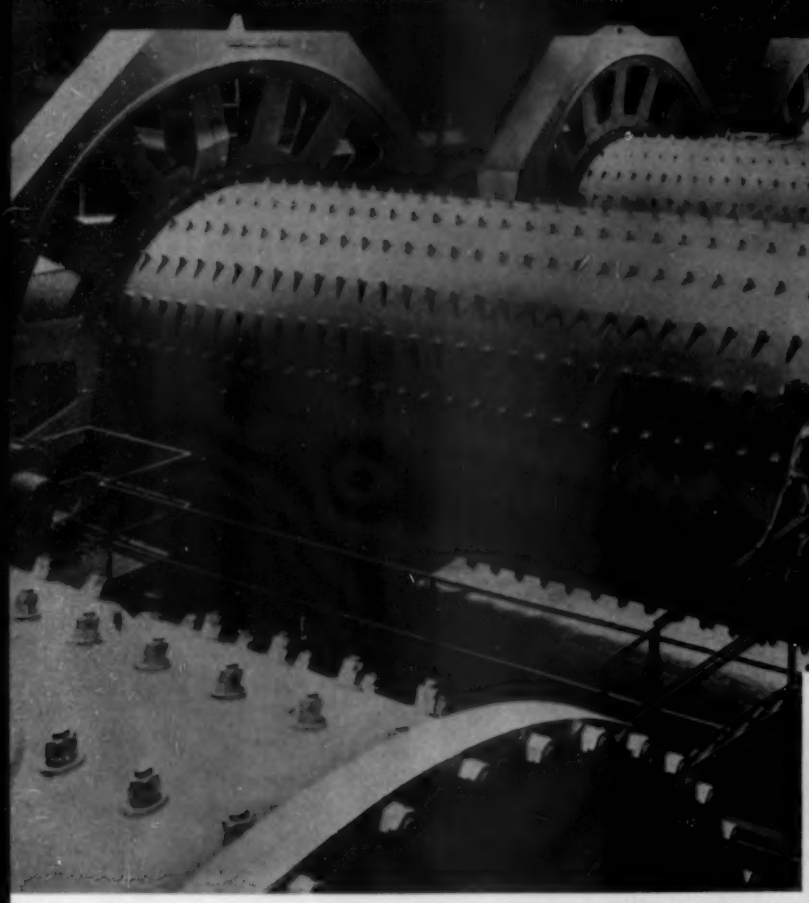
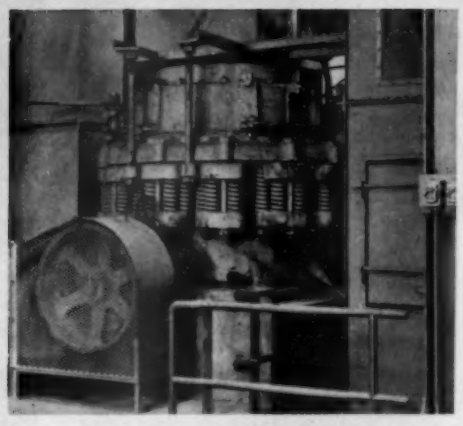
STEP UP PRODUCTION AND PROFITS WITH POWER SHIFT TRANSMISSION

NORDBERG MACHINERY IN THE

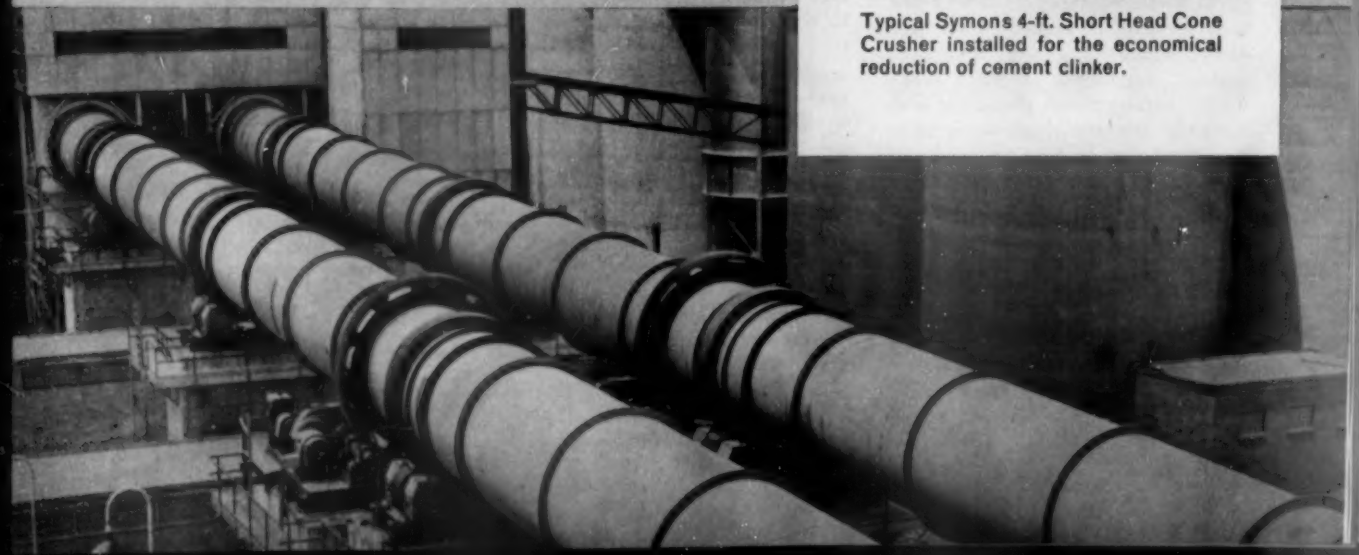


One of five 12′ dia. by 36′ Nordberg Two-Compartment Ball Mills, recently installed in a new wet process cement plant. Driven by 2500 hp motors, these are among the largest grinding mills ever built for cement mill service.



Typical Symons 4-ft. Short Head Cone Crusher installed for the economical reduction of cement clinker.

Two 11′ dia. by 360′ Nordberg Rotary Kilns installed in a large midwestern portland cement plant.



CEMENT INDUSTRY

For over 30 years, Nordberg machinery has been specified by leading producers in the cement industry because of its ability to assure maximum, continuous production at low operating and maintenance cost.

The extensive line of dependable Nordberg cement mill machinery includes Symons® Primary Gyratory Crushers for primary breaking of raw materials; Symons Standard and Short Head Cone Crushers for the preparation of fine, uniformly sized raw mill feed; Symons Vibrating Grizzlies and Screens for scalping and sizing; Nordberg Grinding Mills for wet and dry grinding in ball, tube and compartment types; and Rotary Kilns and Dryers.

For dependable, low cost power, a complete line of Nordberg engines, in sizes to more than 12,000 hp are available to meet practically any cement industry power requirement.

If you are looking for ways to increase operating efficiency and lower production costs, it will pay you to investigate the advantages of Nordberg machinery and the technical engineering services available.

SEND FOR CEMENT BROCHURE

This brochure illustrates the full line of quality Nordberg machinery designed and built for more efficient cement plant operation. Write for your copy today.

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0260-R

NORDBERG MANUFACTURING COMPANY, Milwaukee 1, Wisconsin

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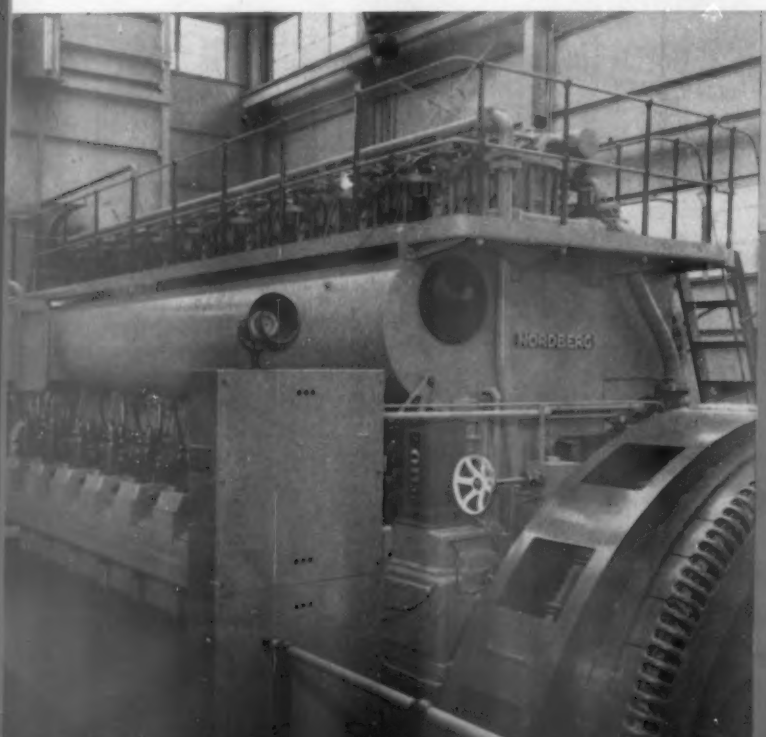
SAN FRANCISCO • TAMPA • WASHINGTON • WICHITA, KAN. • TORONTO • VANCOUVER • JOHANNESBURG • LONDON • MEXICO, D. F.

SYMONS . . . *a registered Nordberg trademark known throughout the world.*



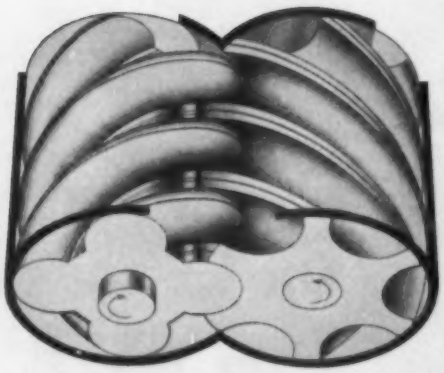
This Nordberg Duafuel® Engine, rated 4425 bhp, 3150 kw, furnishes dependable power for a prominent cement plant in Texas.

Symons Rod Deck Screens like this 5-ft. by 8-ft. unit give many cement plants low per ton screening costs.

Here's the world's FIRST single-engine

1200 cfm

portable air compressor



ADVANCED DESIGN CYCLOIDAL COMPRESSION
This illustration shows the cycloidal rotor method of compressing air. As the lobes and grooves roll into each other, the mating pockets of air are joined and compressed. This design is similar to that of the Ingersoll-Rand Axi-compressor which has been in use for several years for stationary service. New refinements and design features make it ideally suited for large-capacity portable units.

Now, for the first time, you can meet your requirements for large blocks of air power with a compact, single-engine-driven compressor that's *truly portable.* For Ingersoll-Rand's advanced design 1200-cfm portable is no larger than a 900-cfm unit, and actually weighs 1000 pounds *less!*

Driven by a single General Motors 12V71 diesel engine, this new machine utilizes a compact, light weight cycloidal compressor with only two moving parts. It gives smooth, pulsation-free positive-displacement compression with a new high in capacity per pound of compressor weight.

Ask your Ingersoll-Rand engineer or distributor for complete information.

Ingersoll-Rand
258A2 11 Broadway, New York 4, N. Y.

THE WORLD'S MOST COMPREHENSIVE COMPRESSOR EXPERIENCE

continued from page 64

Here are the men who will lead the Expanded Clay and Shale Association for the next term. Pictured left to right are: Vice President B. K. Powers, Virginia Lightweight Aggregate Corp., Roanoke, Va.; President Melvin Cruzen, Light Weight Aggregate Corp., Detroit, Mich., and Secretary-Treasurer D. M. Groves, Shalite Corp., Knoxville, Tenn.

Lightweight aggregate producers meet in St. Louis

February 23-24 were the dates of the annual meeting of the Expanded Clay and Shale Association, held this year at the Sheraton-Jefferson Hotel in St. Louis, Mo. Overall outlook for the industry is optimistic, according to Executive Secretary T. R. Berger's report, and the producers were treated to several very worthwhile papers.

J. A. Hanson, of the Portland Cement Association, spoke on "The Tensile Strength and Diagonal Tension Resistance of Structural Lightweight Concrete." Since architects and designers are having to give increasing attention to tensile strength, rather than compression, Mr. Hanson urged the adoption of code provisions for ultimate load design criteria. He claimed that a comprehensive study of 56 lightweight concrete beams, using eight aggregates, demonstrated that diagonal tension is far more closely related to tensile strength than previously realized, and that modulus of rupture is a very important factor.

Sintering plants in Britain, the Netherlands and Germany were discussed by Lucas E. Pfeiffenberger, technical consultant for the Association. The speaker illustrated his talk with color slides. Of especial interest was the Netherlands installation, where sintering of coal refuse was carried on in a uniquely designed circular machine.

The important topic "Waste Heat Recovery—A Means to Air Pollution Control" was brought up by Joseph Waitkus, manager of sales development, The Air Preheater Corp., Wellsville, N.Y. Many industries are facing serious economic problems due to legislative and other pressure on finding means to control air pollution. Mr. Waitkus pointed out the various methods for offsetting most of the expense through recovering and utilizing wasted heat.

The differing approaches to the operations of forming, drying, and firing lightweight clay units were explained by David O. Anderson, ceramic engineer, Swindell-Dressler Corp., Pittsburgh, Pa.

What's coming in June

Beneficiation of gravel can pay off! Read in June how Mission Rock Co. uses a jig to upgrade 35 tph. of gravel at the low cost of six cents a ton.

Two panel discussions rounded out the meeting. The first covered new applications of expanded clay and shale lightweight concrete, and the chairman was B. K. Powers, chairman of the Technical Problems Committee. The second group, led by D. M. Groves, Shalite Corp., Knoxville, Tenn., discussed the current problems arising out of percentage depletion allowances.

The Association's Mid-Year Meeting was scheduled for July 20-22 at the Americus Hotel, Allentown, Pa.

Please turn to page 71

Just mix and pour

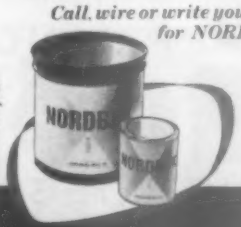
NORDBAK

Tough, Resilient, Non-Metallic

Here it is! NORDBAK . . . the manganese backing you pour at "room temperature." You simply mix the contents of two cans together and pour!

Field tests and on-the-job experience show that NORDBAK really works! Because it's resilient and non-shrinking, it provides excellent backing. It's so tough that in a prolonged test the manganese wore through in spots, but NORDBAK remained uncracked. It's easily removed at changeout, too. You can store NORDBAK at your operations . . . get a supply to keep on hand, ready for the next time you replace liners.

Call, wire or write your order for NORDBAK!



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Milwaukee 1, Wisconsin

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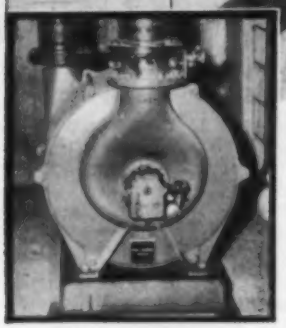
NOW—Stop the Cost Spiral with HOFFMAN fast pick-up and delivery



This 10 hp blower furnishes clean, dry air to Air-Float conveyor

What goes up must come down certainly has not applied to the cost of running a cement plant. One way to halt the rising cost spiral is by maximating production with the help of Hoffman vacuum cleaning machinery and multistage centrifugal blowers.

PAY THEIR WAY QUICKLY Rugged, sturdy multipurpose Hoffman industrial vacuum cleaning/conveying equipment offers these ways to cut costs.

1—Provide fast *pick-up* of spilled cement from cars and trucks at loading areas

2—Recover finished cement spills around the packhouse

3—Remove abrasive dust from mill room machinery

4—Pick up clinker dust around the kiln section

5—Pneumatically sweep crushing and screening areas

6—Reclaim limestone, sand, trap rock and other dry materials before air and moisture cause deterioration

7—Improve working conditions, reduce expenditures for maintenance and recover valuable products

8—The high suction centrifugal exhausters and heavy duty dust separators permit cleaning operations to be carried on at various points in the plant with collection of materials at a central location

BLOWERS HANDLE TOUGH JOBS TOO The multistage centrifugal unit which is the heart of every Hoffman pneumatic system also deals with a wide range of cement plant duties including: combustion air for rotary kilns • fluidizing cement conveyors • aerating storage bins and silos.

RUGGED CONSTRUCTION Hoffman centrifugal blowers have outboard mounted bearings and are designed for direct-coupled drive by any standard motor. One piece cast aluminum impellers are keyed and locked to a heavy steel shaft. The complete rotating assembly is dynamically balanced to insure smooth vibration-free operation. There are no internal wearing parts—no possibility of contamination from oil or grease. Hoffman cast iron centrifugals *deliver* a continuous supply of clean, dry air.

MAXIMATION IN YOUR PLANT To learn how Hoffman industrial air handling equipment can maximate operations in your plant, write for latest catalogues.

AIR APPLIANCE DIVISION

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continued from page 69

"Safety First" should be lime slogan, after '60 statistics

An all-time high of 153 disabling injuries and four fatalities made 1960 the most unfortunate year in the lime industry's history. The frequency rate rose 10 percent over 1959 (to 13.44 disabling injuries per million man-hours); the severity rate rose 70 percent (to 2,598 days lost per million man-hours).

The three most dangerous areas were the truck and rail loading zones, the quarry and the yard (including stockpiling). The high prevalence of falling and bumping into objects indicates carelessness on the part of many laborers. Eye injuries accounted for 20 percent of the total; most of these could have been prevented by wearing goggles. Safety shoes would have prevented foot injuries from ranking as high as 10 percent, and a hard hat might have done away with the 9 percent of injuries to head, upper torso and the neck.

Supreme Court rules on Use Tax

The rock products industry has, in the past, suffered some confusion as to the application of the 2 percent Use Tax. Now the Supreme Court has ruled that, providing your bid and/or your billing is broken down separately as to the haul and the rock, the 2 percent applies only to the rock. However, if your bid or your billing states only one figure for rock and haul, the Use Tax would be applied to both cases.

Public is now using over one-fourth of Interstate System

According to the latest Bureau of Public Roads figures, over 10,400 miles—or more than 25 percent—of the total mileage of the National System of Interstate and Defense Highways are open to traffic.

Of the mileage now in use, 5,135 miles were completed to 1975 traffic standards and 3,041 miles were improved to "full capability" for handling current traffic, although they will need improvements to bring them up to 1975 standards. Toll roads, bridges and tunnels incorporated into the system total 2,264 miles.

The Federal Aid program covered more than half of the mileage in use. The States and localities financed the remaining miles (other than toll facilities), mostly before 1956.

Atlanta to gain sizable Southern Cement plant

A multi-million dollar portland cement plant will get underway this summer for Southern Cement Co., a division of American-Marietta Co. Located near Atlanta, Ga., the plant will have an initial capacity of 1.5 million bbl., which can be doubled by the addition of a second kiln.

A 100-yr. supply of limestone and by-product stone are guaranteed both by the plant's own reserves and under a long-term agreement with the Georgia Marble Co. Southern Cement's headquarters are in Birmingham, Ala.

Potash plant modernizes

The Potash Co. of America is beginning a $3.5 million modernizing program at its Carlsbad, N. M. plant. The project, which is being carried out by Stearns-Roger Construction Co. of Denver, includes doubling the capacity of the granular flotation unit and installing a new flotation unit for the balance of the ore.

Please turn to page 73

NORDBAK

It's Simple, Safe and Sure...

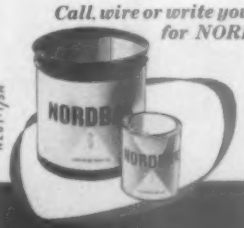
It had to happen...someone was bound to find a way to end the problems of backing maganese crusher parts with molten metal!

Now...you can do it with NORDBAK!

It's mixed at "room temperature" and poured right from a can into the crusher cavities. Gone is the need for special melting and pouring equipment...and gone are the hazards of pouring hot metal.

A trial order will prove, inexpensively, NORDBAK's many advantages.

Call, wire or write your order for NORDBAK!



NORDBAK is a trademark of the Nordberg Mfg. Co.

NORDBERG MFG. CO.

Milwaukee 1, Wisconsin

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Acme-Hamilton introduces "Hy-Impact" Conveyor Belt with "Shock-Weve"!

Over 500,000 tons of rock have been hauled from the primary crusher on new "Hy-Impact" belt at each of three well known plants across the country where 200,000 to 250,000 tons of rock hauled on regular belt was considered normal service life before replacement. For the past two years, Acme-Hamilton has been testing this completely new belt at these plants. To date they have hauled over 500,000 tons each without downtime due to damage, resplicing or replacement. Examination by engineers shows an expected service life of several hundred thousand more tons.

New "Shock-Weve" fabric construction is responsible for this overwhelming service life. Priced the same as conventional belting, "Hy-Impact" reduces cost by half or more because of its doubled service life. Write for more information about this new money-saving belt today. Dept. B-H.

Acme/Hamilton

MANUFACTURING CORPORATION, TRENTON 3, N. J.

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continued from page 71

Booklet discusses portland cement as soil stabilizer

A new bulletin, No. 267, is available from the Highway Research Board, 2101 Constitution Ave., N.W., Washington, D.C. Priced at $1.20, it contains the following four reports:

"A Rapid Field Method for Determining Cement Content of Plastic Cement-Treated Base," by Roger V. LeClerc, supervising highway engineer, and Henry E. Sandahl, associate material engineer, Washington State Highway Commission;

"Cement Requirements of Selected Soil Series in Iowa," by R. L. Handy, associate professor, and D. T. Davidson, professor, civil engineering, Iowa State University;

"Comparison of Type I and Type III Portland Cements for Soil Stabilization," by D. T. Davidson and B. W. Bruns, captain, U. S. Army Corps of Engineers;

"Development of a Test for Identifying Poorly Reacting Sandy Soils Encountered in Soil-Cement Construction," by E. G. Robbins, acting manager, and P. E. Mueller, soils engineer, Soil-Cement Bureau, Portland Cement Association.

Huge "dust catcher" installed at Permanente plant

Neighbors of Permanente Cement Co.'s Bellingham, Wash., plant will have good reason to be grateful when the company finishes its $250,000 dust collection project.

An electrostatic precipitator, installed by the Metal Products Div. of Koppers Co., Inc., will trap virtually all the dust generated by the kilns, preventing it from being blown out over the countryside.

The precipitator will be installed on two wet process kilns. The flue gas streams will be directed through the precipitator, which then charges the gas particles. These high-voltage particles are then attracted toward collector plates carrying an opposite electrical charge, and the plates are cleaned by periodic rapping. The precipitator will be equipped with transistorized, automatic power control units.

Articles of incorporation

Malcolm Stone Co., Grinnell, Iowa, is incorporated to produce specification aggregates for commercial and construction use. Officers are Don Kaser, Des Moines, and Marvin Nelson, Cedar Rapids.

Cooke Aggregates, Inc., Park Hills, Ky., has been chartered to engage in the sand, gravel and aggregates business. Capitalization is $50,000; incorporators are W. Leonard Harper, Jimmie R. Cooke, and John H. Harper.

Potomac Sand & Gravel Co., D. C., has been incorporated to mine, quarry and sell sand, gravel and stone. James R. Farley of Richmond, Va., is agent.

Radford Stone Corp., Radford, Va., is now authorized to quarry stone with capital of $250,000. John N. Dalton is agent.

San Xavier Lime Products, Inc., Tucson, Arizona, has been incorporated by Dan M. and Edwin B. King, and agent Victor H. Verity.

Vancouver Cement company cops fifth safety award

The Portland Cement Association presented the B. C. Cement Co. plant at Bamberton, Vancouver Island, with its fifth trophy rewarding an accident-free year. The plant is rightfully proud of the fact that it has had not one lost-time accident since a broken ankle in 1959.

Please turn to page 74

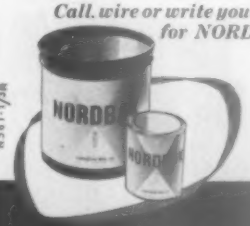
NORDBAK

It's the modern, effective way to back manganese

Non-metallic NORDBAK streamlines crushing operations of every kind. It's as easy to use out in the field as it is in the plant. You mix it and pour it right on the job...*wherever* your crusher is. No need for special melting or pouring equipment. Use it in gyratory crushers, cone crushers, grinding mills and other machinery where backing agents are required.

NORDBAK fills voids as narrow as ⅛" and is only ¼ the weight of other backing agents. Conveniently packaged, NORDBAK is *the one* modern, effective backing agent for manganese crusher parts!

Call, wire or write your order for NORDBAK!



NORDBAK is a trademark of the Nordberg Mfg. Co.

NORDBERG MFG. CO.

Milwaukee 1, Wisconsin

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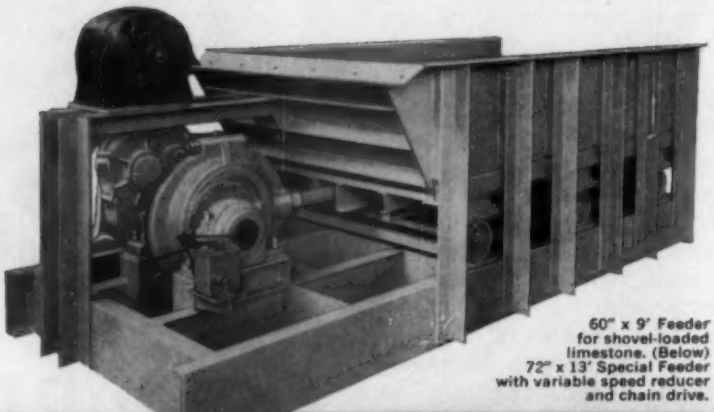
LOW COST FEEDING

from sand to shovel-loaded rock



60" x 9' Feeder for shovel-loaded limestone. (Below) 72" x 13' Special Feeder with variable speed reducer and chain drive.

Built for lower operating costs and long service, these machines feed uniformly controlled quantities of materials. *The result:* elimination of choke-ups, overloads, wear and tear on the feeder as well as on other plant machinery. *Get the facts from Bulletin FRE-57.*

McLANAHAN

RECIPROCATING-PLATE FEEDERS

McLANAHAN Corporation

250 Wall Street • Hollidaysburg, Pennsylvania

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India decides on metric weights for cement sales

By order of the Indian government, only metric weights have been used for the sale of cement since October 1, 1960. For two years, dealers and purchasers went through a confusing transition period when both British and metric systems were in use. Under the new system, each bag contains 50 kgms., cement net exclusive of the weight of the bag, and is marked accordingly. Prices for retail sale will be fixed by each State government individually.

India's cement output will be increased considerably with the construction of a 100,000 metric ton plant near Ammasandra in Mysore State. To finance it, Mysore Cements, Ltd., was granted a $1.1 million rupee loan under the Agricultural Trade Development and Assistance Act of 1954. Willys-Overland Export Corp. and Kaiser Engineers Overseas Corp. have invested in the company, which was organized by P. K. Sarangapany of Bangalore.

What's coming in June

Sampling devices are tools the knowledgeable producer uses to maintain quality. The June issue will have an extensive study of the different types of material samplers now available.

1,000-ton kiln, Japan's largest

A rotary cement kiln with a daily production capacity of 1,000 tons has been added to Mitsubishi Cement Co.'s Kurosaki mill. At its Hiroshima works, Mitsubishi Shipping Co. is now constructing a larger, 1,500-ton capacity kiln for Tokuyama Soda Co.

Three companies report 1960 downturn

International Minerals and Chemical Corp. received a lower net income in the first six months of the fiscal year than during the same period in the preceding year. Profits equalled $1,550,000, as against $1,728,000 in the 1959 period. However, earnings rose during the quarter ended last December 31.

National Gypsum Co. 1960 sales declined to approximately $227 million from $239.7 million in 1959. Although the company expects the construction recession to extend through the first part of 1961, and is presently operating at about 70 percent capacity, it foresees an upward swing toward the end of the year. In fact, it will begin work on its seventeeth gypsum mill, to be located in Tampa, Fla.

Pacific Cement & Aggregates, Inc., reports a revenue for the first three quarters of 1960 of $22,833,573, as compared with $23,289,601 a year ago. Net income was down to $680,947 from $1,214,700.

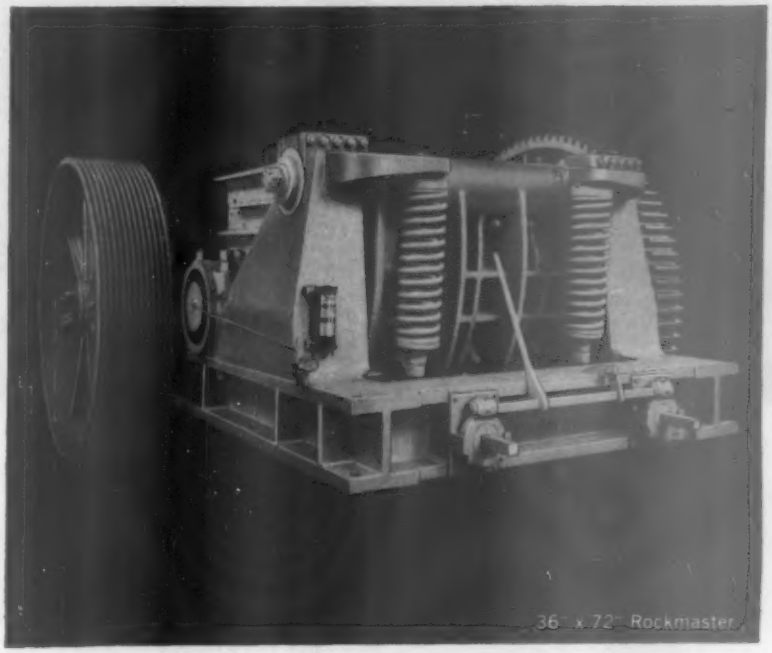
Prosperous '61 ahead for boron products

Despite a tapering off in 1960 and the threat of expanding foreign production, U. S. Borax & Chemical Corp., producers of 70 percent of the U. S. output, foresees considerable growth in next year's market.

Increasing use of glass fiber and porcelain enamel is responsible for this optimism, according to Chemical & Engineering News (January 23, 1961, p. 30). Much emphasis is being placed on research, with plastics and rocket fuel primary projects. Estimated 1961 production for all boron products is 661,000 gross tons.

Please turn to page 76

world's MOST POWERFUL single-roll crushers



Widely used for primary and secondary crushing on the hardest and toughest kinds of shovel-loaded rock and ore, Rockmasters have high capacities and extraordinary ratios of reduction. Also they are the world's finest crushers for wet and sticky feed. Among outstanding design features: Automatic Steelstrut Toggle for release of tramp iron, and Quick-Adjustment for controlling size range.

Get all the facts from Bulletin RMTD-56.

McLANAHAN

ROCKMASTERS

McLANAHAN Corporation

250 Wall Street • Hollidaysburg, Pennsylvania

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Performing a TOP JOB...
The MIKRO-PULSAIRE
DUST COLLECTOR

Installed at the Hawaiian Cement Company's new plant at Barber's Point, Oahu, you'll find a total of nineteen MIKRO-PULSAIRE Dust Collectors, four of which are pictured above.

Because it has no moving parts . . . internally or in the gas stream . . . the MIKRO-PULSAIRE has proved ideally suited to handling highly abrasive materials such as cement. Other features to be considered are its record of 99.9% *plus* recovery, and high air-to-cloth filter ratio. Our Hawaiian installation provides a total filtering capacity of 329,928 cfm. Whatever your requirements, the MIKRO-PULSAIRE can deliver a top job for you, economically and with maximum dependability.

MIKRO-Products
PULVERIZING MACHINERY COMPANY
2 Chatham Rd., Summit, N. J.
A Division of American-Marietta Company

REPRESENTED THROUGHOUT THE WORLD IN SALES, SERVICE AND MANUFACTURING FACILITIES.

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INDUSTRY NEWS

continued from page 75

High-purity gypsum mine feeds Bestwall's new Kansas plant

Late in February the new Bestwall Gypsum Co. plant near Blue Rapids, Kan., entered production with 85 employes and a 40 percent increase in capacity. The former plant, in operation since 1896, had been replaced to allow flowage for the recent Tuttle Creek Dam and Reservoir project.

The Bestwall plant, which will produce industrial and wall plasters, as well as gypsum board and lath, is supplied by the oldest active gypsum mine west of the Mississippi. It contains gypsum rock with a purity rating upwards of 99 percent.

In addition, the plant will have a complete laboratory, in order to maintain rigid specifications of expansion, setting time, fluidity and particle size.

State cement plant takes land option

The South Dakota Cement Plant Commission has taken an option for one year on 160 acres of land outside of Wolsey. The land, being situated at an intersection of the Milwaukee and North Western railroad lines, would be a conventient spot for a distribution center to handle the production of the plant at Rapid City. It would also enable it to meet competition in the eastern part of the state.

The only state-owned cement operation had a thriving year in 1960, even in a time of industry-wide decline. Portland cement sales were up 5.9 percent; masonry cement sales climbed 2.9 percent. The Rapid City plant supplied eight states during the year—besides South Dakota, there were North Dakota, Wyoming, Montana, Nebraska, Minnesota, Colorado and Iowa.

Please turn to page 78

2 "automatics" do the work of 3 "stick-shift" trucks

Save 5.9¢/mile—over $1,000 a year—for W-W Concrete Company, Inc.

What difference can a *fully* automatic transmission make in a truck?

"Plenty," says Robert L. Welker, board chairman of W-W Concrete Company, Inc. in Roanoke, Indiana.

And from his company's experience with two Transmatic-equipped Fords, he has the facts and figures to prove it.

Item: $890 saved each year in engine and transmission repairs because the Transmatic transmissions eliminate shock-load damage . . .

Item: $72 a year saved in clutch replacements (Transmatics don't have engine-disconnect clutches) . . .

Item: $48.50 a year saved in minor engine maintenance costs.

It adds up to savings of more than $1,000 a year—5.9¢/mile—over stick-shift transmissions in trucks doing the same work.

And the big plus is this:

The two Transmatic-equipped Fords do as much work as three stick-shift trucks. Imagine what that means to W-W in capital expenditure and operating cost savings!

No wonder W-W Concrete is planning to add more trucks with *fully* automatic transmissions to its fleet.

Want the full story on *fully* automatic transmissions for your trucks? Call your truck dealer or mail the coupon today.

Allison Division of General Motors
Box RP-5, Indianapolis 6, Indiana

Please send me the 12-page color brochure describing the Allison Fully Automatic Truck Transmission.

Name_____
Title_____
Company_____
Address_____
Street
City_____ Zone____ State_____

Allison ***FULLY*** **AUTOMATIC TRUCK TRANSMISSIONS**

NOW AVAILABLE IN

CHEVROLET	DIAMOND T	DODGE	REO	REO
POWERMATIC	ALLISON AUTOMATIC	TORQMATIC	TRANSMATIC	REOMATIC

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S&H MODEL 30

CORE DRILL MACHINE

• LIGHT
• COMPACT
• PORTABLE
• VERSATILE

• The ideal machine for foundation investigation and shallow mineral exploration.
• Available with either screwfeed or hydraulic swivel-heads with or without built-in water pump and a wide choice of power units.
• Unit can be skid, truck, or trailer mounted.
• The Model 30 is a quality machine produced by a quality manufacturer.

Look for our emblem... It's your Seal of Quality

SPRAGUE & HENWOOD, Inc.
SCRANTON 2, PA.
MEMBER OF: DIAMOND CORE DRILL MANUFACTURERS ASSOC.

New York • Philadelphia • Nashville • Pittsburgh • Grand Junction, Colo. • Tucson • Buchans NfId.
Export division: Sprague & Henwood International Corporation, 11 W. 42nd St., New York, N. Y.
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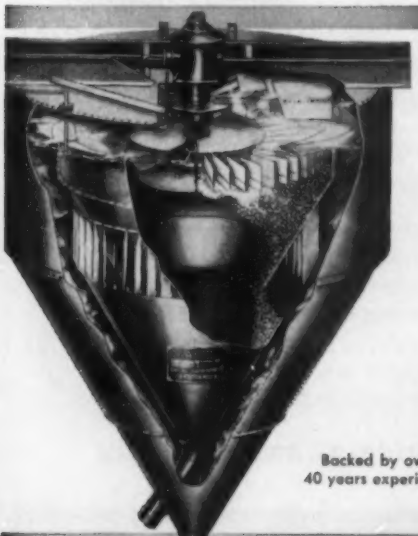
USING SCREEN SEPARATIONS? NOTHING CLASSIFIES AS PERFECTLY AS AIR

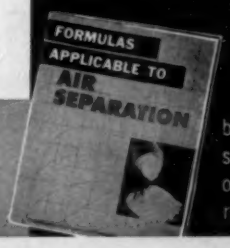
GAYCO
CENTRIFUGAL AIR SEPARATORS

Classify practically all dry fine materials

You get:
• CLOSER SEPARATIONS
• IMPROVED PRODUCTION
• NO UNDESIRABLE OVERSIZE.
RANGE 60 to 400 mesh.
Timken bearings.
Choice of Standard or Heavy-Duty Models.



Backed by over 40 years experience



this helpful booklet sent on request

Robert M. Gay Division
UNIVERSAL ROAD MACHINERY CO.
117 Liberty St., New York 6, N. Y.
Factory and Laboratory: Kingston, N. Y.
In Canada: Watson-Jack Hopkins Ltd., Montreal

Enter 1053 on Reader Card

INDUSTRY NEWS

continued from page 76

Dundee Cement will open second Chicago terminal

Very shortly a brand new $600,000 distribution and service center will be doing business for Dundee Cement Co., Dundee, Mich. Located near Chicago's O'Hare Airport, the terminal will be the company's second in the area—the other being the two-year-old operation at 95th Street and the Calumet River. This expansion will make it possible for the north and northwest suburban areas to receive fast and efficient truck delivery, with fewer chances of shortages or service problems.

Literature ready on Ohio shale sequence

"Devonian-Mississippian Sequence in Ohio," by Karl V. Hoover, is now available as Information Circular No. 27 from the Ohio Division of Geological Survey, 155 S. Oval Drive, Columbus 10, at $1.

The circular reviews and summarizes all the published information concerning a thick sequence of shale rock underlying over 60 percent of the state. Economic production and potentials of this rather controversial deposit are discussed.

28 concrete silos added to Michigan plant

Huron Portland Cement Co., Alpena, Mich., is now storing up to 250,000 bbl. of cement in 28 reinforced concrete silos. In the usual slipform construction method, the 8-in. silo walls were poured into wooden forms which were slid upward over the concrete by pneumatic jacks at 6 in. per hour until the 147-ft. height was reached. Reinforcing steel was placed as the concrete was poured.

Please turn to page 80

Enter 1054 on Reader Card

Special Report to Users of Caterpillar Equipment: Custom TRACK SERVICE

Custom Track Service saves coal stripper $3298 by adding 3800 hours to track life

A coal stripper, ripping and 'dozing rocky overburden 7 days a week around the clock, was averaging 2300 hours of life before he *replaced* most of his totally destroyed track group parts. At the suggestion of his Cat Dealer, the stripper tried new, larger-size undercarriage parts. By following recommendations of the dealer's undercarriage specialist at 2440 and 4030 hours, the undercarriage went a total of 6100 hours with only pin and bushing replacements . . . and all but the shoes were rebuildable instead of scrap! Up to this point, Custom Track Service saved the stripper a $3298 cash outlay; and since he was able to rebuild the links and reuse the pins and bushings instead of replacing with new assemblies, he realized additional savings.

PAST EXPERIENCE

ALL BUT SHOES READY FOR SCRAP PILE AFTER 2300 HOURS

PRESENT EXPERIENCE

COMPLETELY REBUILDABLE EXCEPT SHOES AFTER 6100 HOURS

HOW CUSTOM TRACK SERVICE HELPS LOWER COSTS

Custom Track Service, available only from your Caterpillar Dealer, is designed to help you get the most possible service from undercarriage parts and thus cut costs. Factory-trained specialists are ready to help solve your particular track problems. They can give sound recommendations to help you get the most from your undercarriage.

They can advise you on maintenance . . . help you tailor the many special undercarriage parts and track options available to meet various job conditions. As a result, costs per hour go down and profit and machine availability go up.

These undercarriage specialists are backed by modern track undercarriage rebuilding facilities manned by experienced personnel . . . by the largest and most complete stock of standard and special application parts available . . . by Parts Exchange Assemblies that keep tractors working and earning.

Check with your Cat Dealer and learn how Custom Track Service can help you to reduce costs.

Caterpillar Tractor Co., General Offices, Peoria, Ill., U.S.A.

CATERPILLAR

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

NO SPOT FOR A BREAKDOWN!

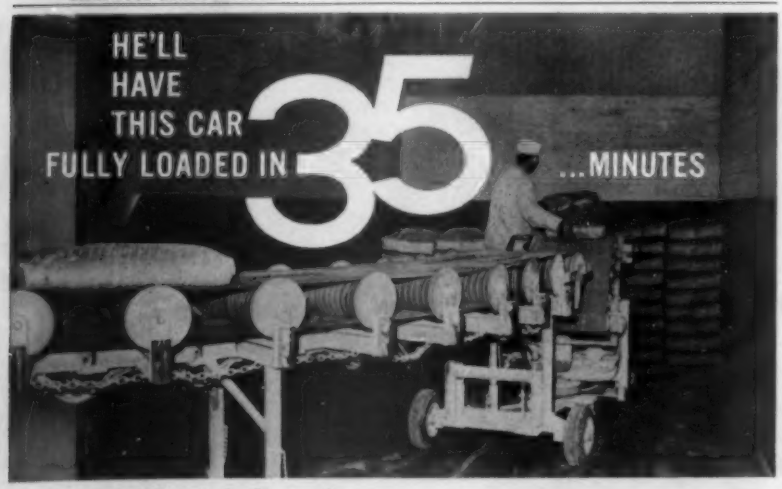
KEEP IT GOING AT ITS BEST ...USE ONLY GENUINE HAYWARD REPAIR PARTS!

Hayward Buckets are designed with the most efficient construction features known. And only with *genuine* Hayward replacement parts can you be sure of maintaining that same high quality. Cheaper "bootleg" parts reduce efficiency, raise operating costs and disrupt schedules.

Anticipate any possible breakdown.
Write today for list of genuine Hayward parts.

THE HAYWARD COMPANY
50 CHURCH STREET, DEP'T R, NEW YORK 7, N. Y.
Builders of Better Buckets Since 1888

Enter 1050 on Reader Card



...without help, using a POWER-CURVE Loader

Bag loading costs of eight cents a ton are not uncommon in plants using Power-Curve equipment. One man loads and stacks direct from the packer with no need to lift a single bag. Loads can be palletized or stacked in any pattern, also put into warehouse storage.

There are Power-Curve installations near you. Let us show you how your plant can benefit from a custom engineered Power-Curve loading operation.

Literature and engineering details sent on request.

POWER-CURVE
CONVEYOR COMPANY
2185 SOUTH JASON ST., DENVER 23, COLORADO

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INDUSTRY NEWS

continued from page 78

New test developed for barium content

Before this accurate test was devised by C. L. Ford, little was known about the barium content of portland cements. In his article "A Gravimetric Method for the Determination of Barium Oxide in Portland Cement," Bulletin 115 of the Portland Cement Association Research Department, reprinted from the ASTM Bulletin (July, 1960), Mr. Ford describes his method based on the insolubility of barium in the sulfate form, and the solubility or volatility, under the conditions of the procedure, of all the other elements present in portland cement.

Chemical Lime announces new plant for Florida

The newly organized firm, Chemical Lime, Inc., Ocala, Fla., will provide a local source of high-quality chemical lime for Florida users when its $2-million plant goes into operation this summer. The plant, to be erected at Brooksville, will be a 200-tpd. installation. It will process limestone from the quarry of Camp Concrete Corp.

Contract for construction of the plant was awarded to Dorr-Oliver Engineering, Ltd., Stamford, Conn. Plans call for a duel Dorrco Fluosolids system, with a single-stage reactor for drying the crushed limestone and a multiple-stage reactor for calcining.

Ontario Sand & Gravel adds New York firm

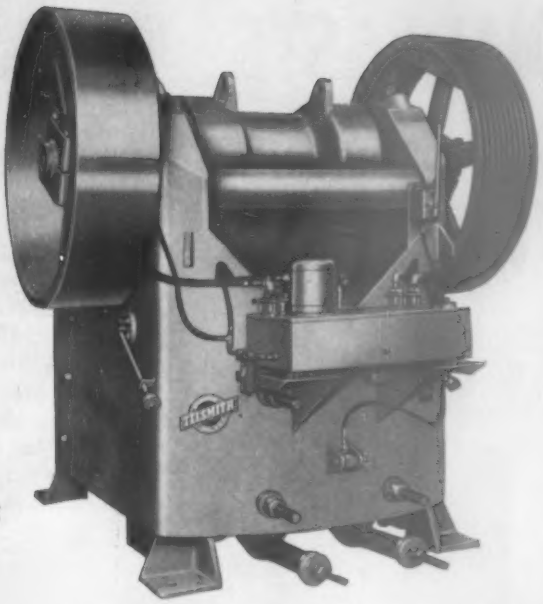
Ontario Sand & Gravel Co. has purchased real and personal assets, including land, trucks and buildings, of the Mohawk Paving Co., Geneva, N.Y. Ontario will continue to operate the plant in addition to its own holdings.

Please turn to page 82

completely

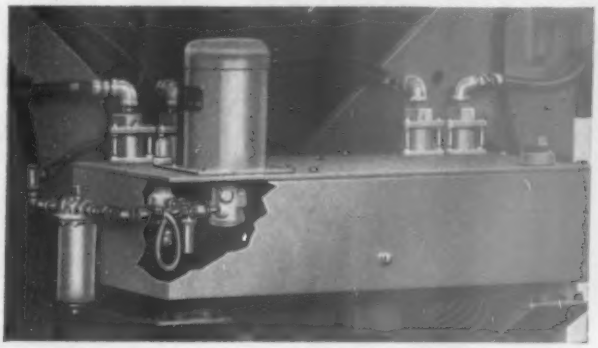
NEW

AUTOMATIC OILING SYSTEM



Available as optional equipment on 30" x 42" and 42" x 48" sizes

- *bearings last longer*
- *lube costs go down*
- *capacity goes up*
- *PROFITS are BIGGER*



the ODDS are 80 to 1 in your favor

Now under severest abrasive dust conditions Telsmith Jaw Crushers run cooler at full capacity with oil changes every 4 months and *no time out for lubrication in between.* From 80 grease jobs to 1 oil change! More vital, you automatically end bearing failure due to improper lubrication. Filter-fresh oil in correct quantities circulates automatically, greatly prolongs bearing life, improves crusher performance. Find out why and how this newest jaw crusher development will save you many times its cost. Ask your Telsmith distributor.

HOW THE SYSTEM WORKS

Oil is pumped through the filter into crusher bearings and returns to the reservoir through flexible hoses. The pressure by-pass serves to insure a flow of constant pressure to the bearings and the temperature sensing device sounds an alarm if the oil temperature exceeds an acceptable limit.

The pressure-temperature control switch is mounted on the bottom of the tank for easy access. The tank can also be fitted with heating elements for cold weather starting. *Send for Bulletin 280.*

J-4-361

SMITH ENGINEERING WORKS

508 E. CAPITOL DRIVE, MILWAUKEE 1, WISCONSIN

DIVISION OF Barber-Greene

Cable Address: Songworks, Milwaukee • Representatives in Principal Cities in all Parts of the World

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OUT-LASTS.. OUT-PERFORMS THEM ALL

for long-economical service get the . . .

CAPE ANALLOY
STEEL
DROP BALL

Extra life and wearability are FORGED into the "Cape Ann" Drop Ball for efficient, economical performance. FORGED and heat treated from tough abrasion resisting steel. "Cape Ann" Drop Balls are Sonic Tested before shipment and are fully guaranteed.

CAPE ANN
ANCHOR & FORGE CO.
P. O. BOX 361
GLOUCESTER, MASSACHUSETTS

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continued from page 80

Dynamite wrecks Georgia quarry, crime indicated

On March 19, violent explosions and fire ruined the Weston & Brooker Co. rock quarry plant near Macon, Ga.

At least one case of dynamite caps was stolen, and it was estimated that 10,000 lb. of dynamite were used. Police claimed that in all probability hoses were laid from a gasoline tank to the buildings, the gasoline was lighted and the dynamite set off.

When the main dynamite magazine exploded, it leveled an area 250 yd. across and blasted a hole 60 ft. deep. A nearby truck was blown apart, and the largest piece found was a tire—some 100 yd. away.

The company office, including its safe and records, a shop, storage building, smaller warehouse and various pieces of equipment were destroyed. A dozen homes within a 4-mile radius were also damaged.

CALENDAR

OF COMING EVENTS

1961

June 12-13, 1961—National Limestone Institute, Mid-year Board and Committee Meetings, Sheraton-Blackstone Hotel, Chicago, Ill.

June 25-30, 1961—American Society for Testing Materials, 64th Annual Meeting, Chalfonte Haddon Hall, Atlantic City, New Jersey.

July 13-14, 1961—National Crushed Stone Association, Mid-year Meeting, Board of Directors, The Greenbrier, White Sulphur Springs, W. Va.

July 20-21, 1961—Expanded Clay and Shale Association, Mid-year Meeting, Americus Hotel, Allentown, Pa.

August 10-12, 1961—National Sand and Gravel Association —National Ready Mixed Concrete Association, Controllers Conference, Edgewater Beach Hotel, Chicago, Ill.

August 20-24, 1961—Semi-annual meeting, Board of Directors, National Sand and Gravel Association, The Greenbrier, White Sulphur Springs, W. Va.

September 10-13, 1961—American Mining Congress, Metal Mining & Industrial Minerals Convention, Seattle, Wash.

October 5-6, 1961—National Lime Association, Operating Meeting, Shoreham Hotel, Washington, D.C.

October 16-21, 1961—National Safety Council, Annual Convention, Conrad Hilton Hotel, Chicago, Ill.

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The BELT Lasts Longer!

(and so do maintenance dollars!)

. . .with McNally Pittsburg's new conveyor

Here is a new and entirely different type of belt conveyor. The secret of its amazingly improved efficiency is in the exclusive design of the McNally Pittsburg patented cradle idler, which consists of 5" rubber rollers, assembled on precision-ground ball bearings, prelubricated and lifetime sealed. The rollers are suspended in a true catenary, on flexible, nonrotating stainless steel wire rope, which cannot corrode. Because the wire rope does not rotate, it cannot twist and cause loping, dangerous harmonics, and undue belt wear.

The wire rope is supported at each end by a simple ball joint, so it is free to move in any direction, permitting the belt to adjust itself to any profile. The true catenary suspension provides uniform belt support without bends or creases. *Thus belt life is substantially increased.* The entire conveyor is shipped disassembled, and may be put together in the field to fit your application.

McNALLY · PITTSBURG

McNally Pittsburg Manufacturing Corporation—
Manufacturing Plants: Pittsburg, Kansas • Wellston, Ohio
Engineering and Sales Offices: Chicago • Rio de Janeiro
Pittsburg, Kansas • Wellston, Ohio

Write Today

McNally Pittsburg Mfg. Corp.
Dept. RP
Pittsburg, Kansas

☐ Please send information on the new McNally Pittsburg Belt Conveyor.

☐ Have Sales Engineer call for further consultation.

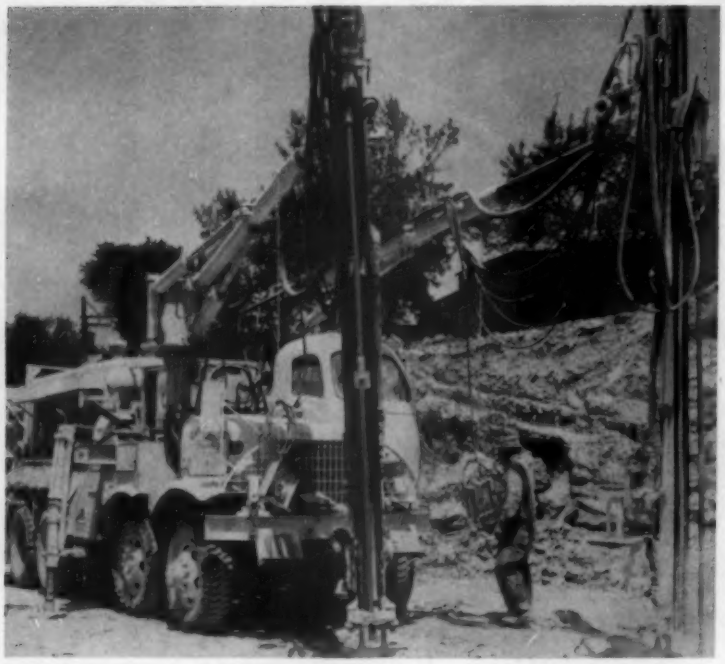
NAME_____ TITLE_____

COMPANY_____

CITY_____ STATE_____

HINTS & HELPS

PROFIT-MAKING IDEAS DEVELOPED BY OPERATING MEN



Truck-mounted drills for tight quarters mobility

A midwestern drilling contractor has developed an ingenious drilling rig that might suggest drilling improvements to quarry owners who need great mobility in tight quarters.

Two standard drilling rigs are mounted on an army surplus 6 x 6 chassis where the driver's cab was originally. A big 900-cfm. compressor and diesel engine are mounted over the rear wheels. Master controls are placed in the truck's relocated cab, while each mast has its own portable control box.

Electrical safety tips from the National Safety Council

The National Safety Council reminds us that electrical equipment is a source of great danger, particularly around electrically operated portable machinery. Even though production machinery may rest on the surface of the ground, the electrical contact may not be good. In fact, this type of equipment usually has exceptionally high resistance between the frame and the earth.

How long has it been since the grounding systems in your plant have had a careful resistance check? The electrical parts of shovels, and similar equipment should be inspected and maintained by a trained electrician. It would help to improve the safety of your whole plant if every conduit, electrical motor and switchgear was checked regularly.

Navigation obstructions

No, this isn't some producer's idea of decoration for his big storage bin, nor a free ad for Purina Chows. It just happens that the tower projects into the navigation pattern for a nearby

military aviation installation. You will probably see more of these red and white checkered patterns as airfields move out into the countryside to be neighbors with many rock products producers.

Old cars never die

When a Texas producer saw a car of ancient vintage in a junk yard, he decided that he had enough wind and rain in his hair. It was a quick and simple matter to carve up the old coupe and weld it securely to the frame of his favorite jeep. A bracket for a spare tire completed the job for him.

Harry Hess, Houston 33, Texas

Please turn to page 88

Enter 1073 on Reader Card

How the clam-action 4-in-1 gives you

'equipment spread' utility...

with a one-man "crew"!

Move the "machine action" selector lever—see for yourself how the International Drott 4-in-1 gives you equipment spread utility with a one-man "crew"—does dozens of jobs, other excavator-loaders can't touch! Prove that the 4-in-1 saves you the expense of buying or renting additional machines, and of hiring extra operators. Let your International Drott Distributor demonstrate!

International Harvester Co., Chicago 1, Illinois

Drott Manufacturing Corp. Milwaukee 15, Wisconsin

INTERNATIONAL DROTT

You get a full-capacity, earth rolling bulldozer simply by opening the 4-in-1's clam—with 2-finger hydraulic lever ease. This TD-15 Four-in-One is clearing off brush and removing overburden from a deposit of sub-base materials.

Let the 4-in-1 double for a boom-type shovel in many conditions—as this operator does. Here, his 1⅛ cy. yd. TD-6 Four-in-One applies famous pry-over-shoe break-out action and "doubles for dynamite" to dig hard materials without shooting.

End sticky materials problems for good, the way dredging contractors do: with positive clam-action bottom-dumping. Note how opening the 4-in-1's clam pulls materials from bucket surfaces—and gravity down-pull does the rest—to enforce positive, self-cleanout dumping.

You can back-drag materials wholesale (and safely) from the sand, clay, or gravel bank. And use this same action to grab, carry, and load heavy, unwieldy "impossibles" including stumps, boulders, and slabs of rock—without delay or extra help!

Nine-Unit Payhauler fleet *serves*

Eleven-second dumping with positive power-up, power-down control of body action is provided by the inverted, double-acting hoist system as furnished by International. For similar all-around cycle-speeding advantages in a 19-tonner, see the 65 Payhauler!

Florida Rock Products Corporation

Here are five of the nine 95 Payhauler rear-dumps owned by Florida Rock Products Corporation—hauling from quarry to crusher. Fleet operates in Hernando County, Florida.

"Our Payhauler units are doing everything we expected of them—and are performing very satisfactorily."—T. S. BAKER, *President*
Florida Rock Products Corporation

Florida Rock Products Corporation moves rock from quarry to crusher with a fleet of nine International Model 95 Payhauler rear-dumps. Payhauler offers an exclusive combination of capacity-adding, cost-reducing features of special appeal for tough, heavy, off-road mine and quarry hauling.

Of all 27-ton off-road haulers, only the 95 Payhauler gives you the ton-shedding, brawn-boosting advantages of the rock-ribbed corrugated body. Only the "95" is plus-powered by the 375-hp DT-817 turbocharged International diesel engine. Choose the "95" with power-shift torque converter or 9-speed air-shift transmission.

Grade charts prove that the "95" Payhauler is in a class by itself for upgrade hauling—giving a speed advantage of up to 44%! Compared to 27-ton competitors, only the "95" is "one hand" power-steered with International's high-leverage enclosed system —or is quick-dumped (in 11 seconds) with power-up, power-down inverted hoist action.

See for yourself in your own off-road hauling how an International Payhauler can increase your capacity, and give you record economy. Let your International Construction Equipment Distributor demonstrate.

International*® *Construction Equipment

International Harvester Co.,
180 North Michigan Ave., Chicago 1, Illinois
A COMPLETE POWER PACKAGE

continued from page 84

Stone ladder design

As aggregate specifications get stricter, there is more profit for the producer to spend money to give his product a great deal of tender care. Purposes: to prevent breakage in handling and avoid making undesirable dust.

One of the standard ways of handling materials gently into deep piles is the stone ladder. These have developed into very substantial structural steel towers with shelves that catch material (A). In this way, the

crushed stone itself becomes the "wear plate" that cushions the impact of material and, at the same time, protects the steel from the abrasive wear of the rock.

More conventional are the towers (B) that support steeply in-

clined plates. This design is quite adequate when natural gravel is handled as this western sand and gravel producer is doing.

Spreading speed matches loading speed

A west coast producer has developed techniques for putting zip into his haulage procedures. He has done this by distributing sub-base materials from moving trucks just about as fast as he loaded them into the trucks.

Loading speed is achieved with a loading elevator with a side-mounted conveyor to put the operator. When the truck moves along with the loading unit and, with careful operation, each truck can be trimmed as it is loaded.

The truck bodies are fitted with special bottom dumping

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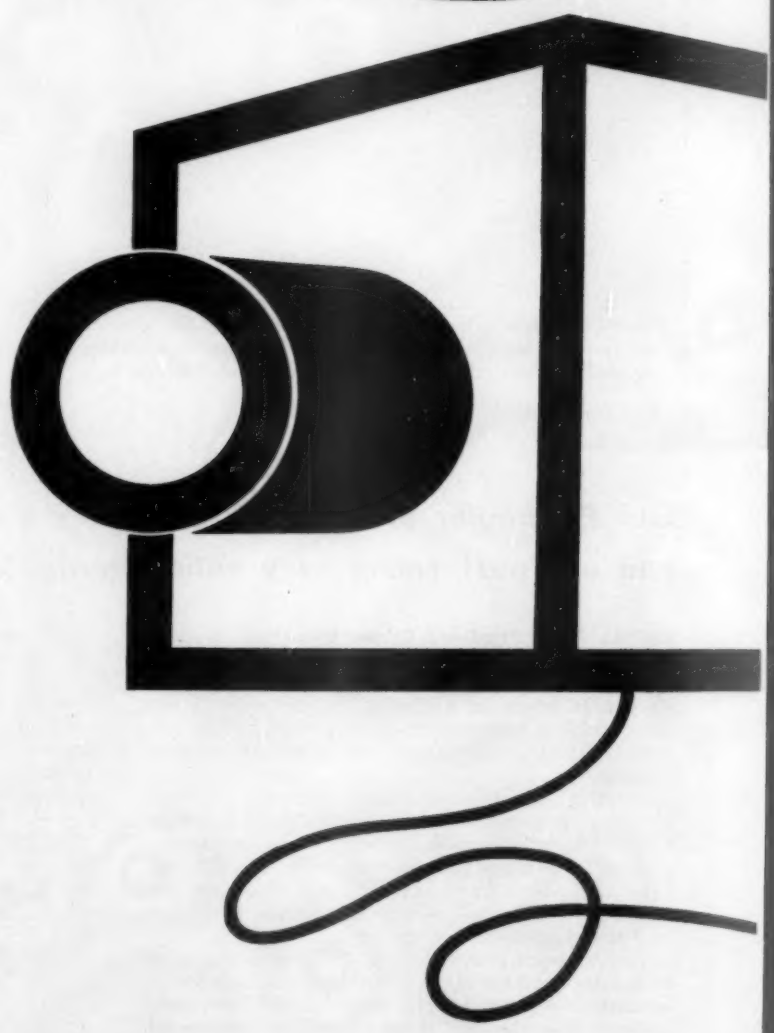
FIRST IN INDUSTRIAL TELEVISION



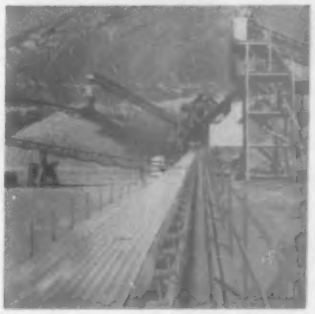
doors that can be regulated by the operator. When the truck reaches the paving project, the operator discharges his load of material without stopping.

Tips to keep fines on conveyors

Corrugated steel covers for belt conveyors handling dusty materials are probably not as well or as widely known as they should be. And many producers apparently prefer to use ingenious substitutes.

One western gypsum processor found that a simple steel sheet bolted to the handrail of an inclined conveyor was all that was necessary to prevent windblown fines.

Another aggregates producer with much finer sand realized that the entire conveyor should be covered. This was accomplished by building up a framework of wood above the carrying run of the belt. Then corrugated siding was bolted to the supporting woodwork.



Security for controls

A western rock products producer arranged his control panel so that every part of the crushing and screening plant was within one man's reach. This was accomplished by mounting the push buttons on the door of the control room. Power cables provide the flexibility needed when the door is opened and closed.

This arrangement has another, vital advantage. When the plant is not operating, the door can be closed, barred and locked. The control panel with its push buttons is out of sight and beyond the reach of all but the most aggressive vandal.

END

HELPS IDEAL CEMENT KEEP CLOSE CONTROL ON KILN BURNING . . . FROM 150 FEET!

Here's how Diamond Utiliscope Closed Circuit TV assures Ideal Cement of optimum kiln burning at their modern new Houston, Texas, plant: A Model 300 Utiliscope camera is mounted at the clinker discharge end of each of the plant's two 12 x 450 ft. wet-process kilns; lets the operator (in an air conditioned control room 150 ft. away) view 50 to 60 ft. of kiln interior from "load line" to clinker discharge point. Thanks to the Utiliscope system of remote visual observation plus a high degree of instrumentation, operators exercise precise control of production variables to insure highly uniform clinker.

Ideal Cement's Utiliscope systems are further evidence of Diamond Electronics' unique ability to design and build closed-circuit TV that provides reliable viewing under the Cement Industry's most brutal conditions (i.e. . . . the Utiliscope cameras at Ideal operate in ambients of 2100°F.!) Our engineers will be happy to demonstrate how Utiliscope can cut costs, improve product quality in *your* existing or proposed plant. For complete information, send us the coupon below.

Diamond Electronics

Division of Diamond Power Specialty Corporation

Diamond Electronics • Lancaster, Ohio

Please send complete information on how Diamond Utiliscope can help reduce operating costs and improve operations.

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DUNDEE CEMENT USES

AUTOMATIC LOADING direct from 200,000 bbl. storage silo. Six spouts, fed by reversible belt conveyors, each loads out 300 tons per hour. Three 4-tube bag packers each packs 1,600 bags per hour.

LARGEST IN THE U. S., these F. L. Smidth dumbbell-type kilns are 460' long and largest diameter is 16'6". Texaco Meropa Lubricant and Crater 5X Fluid are used for such demanding applications as girth gears and riding rings.

TEXACO PRODUCTS

New, 6,000,000-barrel Dundee Cement Co. plant —the world's largest built at one time—depends on Texaco for efficiency and maintenance economy

COMPACT DESIGN of Dundee Cement Co. plant near Dundee, Michigan, cuts total traveling distance of raw material from primary crusher to packing plant to only 4,000 feet.

FOUR CONTROL PANELS run entire operation. This panel controls mills. Others control: clay preparation, limestone preparation, and kilns. All equipment—from primary crushers to weighing scales—is 100% Texaco-lubricated.

Huge as it is, the $25,000,000 plant is completely operated by just *four* control panels. What's more —the design permits *doubling* plant capacity without altering any present installations.

Keeping this vast complex of highly automated equipment running efficiently calls for a lubrication program that is simple, complete, and virtually foolproof. Dundee chose Texaco to help them with the job.

With Texaco's Organized Lubrication Plan as a framework, Texaco and Dundee engineers worked out the right lubricants for every piece of equipment.

A Texaco Lubrication Engineer will gladly show you how Texaco's Organized Lubrication Plan can fit into your operation...how it can mean greater efficiency and maintenance economies. Call the nearest of the more than 2,300 Texaco Distributing Plants, or write Texaco Inc., 135 East 42nd Street, New York 17, N.Y.

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MEET ANY SPECIFICATION-ACCURATELY AND ECONOMICALLY

with these two lines of COMCO classification equipment

Here are two lines of equipment that classify materials so accurately and economically you need *never* again fight the battle of the specs.

These COMCO systems, used extensively throughout the world where *precise* classification is absolutely essential, are now available for use by the smallest or largest plants.

Want to know how COMCO equipment can improve *your* operations? Write us. We'll be glad to cooperate. COMCO CORPORATION, 5421 Lancaster Avenue, Philadelphia 31, Pa.

RHEAX® SYSTEM Classification Plants

No market specification is too tough for a Rheax hydraulic classification plant. It performs precise classification of fine materials (down to 3 microns) with an economy that is unmatched anywhere.

ACCURACY—The curves identify an actual case of Rheax plant performance, typical of its on-the-job capability. Yet this is far from its limit:

Rheax plants *maintain the same accuracy regardless of*

- variations in quantity or grading of raw material
- desired marginal size of separation
- number of desired fractions

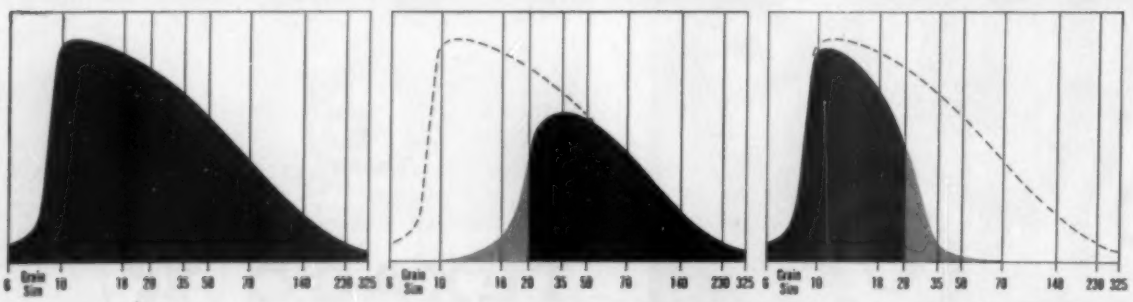
ECONOMY—The most important economy of a Rheax plant is its unbelievably low operating cost, because it needs

- *no operators*
- *no power* except for pumps and vibro dewaterers

Its initial cost is also unusually low, because it is compact, has no complicated moving parts, and is assembled from standard components.

Whether you're looking for improvements in classification or dewatering or both, a Rheax System can do it even beyond your expectations. Find out for yourself. Write us.

Rheax classification plants have proved their performance in installations throughout the world. On many projects, Rheax plants have made possible better concrete with 15 to 30% less cement.



A. This typical natural raw sand was fed to a Rheax plant for continuous separation at Mesh 20.

B. Composition of the minus Mesh 20 and the plus Mesh 20 fractions achieves near perfection as shown by the black sections above. These curves represent an actual case history of Rheax performance.

BINDER SYSTEM Vibratory Screens

No vibratory screen, regardless of type, make or origin, classifies as accurately and economically as the Binder System screen.

There's a reason.

The vibrating masses (both screen decks) are *completely* balanced not only at rest, but also in motion. They oscillate against each other in a linear motion (*not* circular or elliptical) with amplitudes of equal size. Supported exactly in their center of oscillation—a point of *no* oscillation—the vibrating screens transmit *no* dynamic power to the base frame. Hence no dampeners of any sort are required between the frame and foundation.

Briefly: In the Binder System, the screens vibrate as vigorously as the job requires, BUT THE FRAME STAYS ABSOLUTELY STILL. This is true of *no* other vibratory screen.

Binder System horizontal vibratory screens can improve *your* operations.

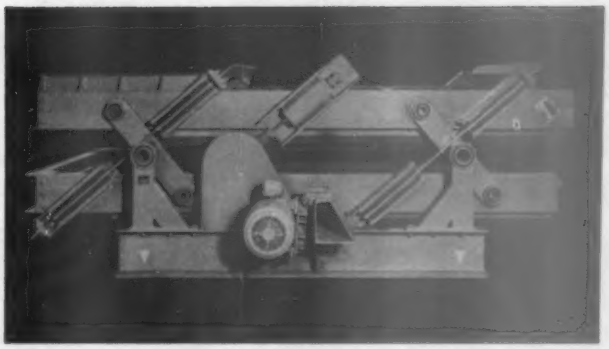
THEY IMPROVE CLASSIFICATION because they

- convey material uniformly—every opening is 100% effective
- eliminate bouncing or cascading of materials on the screen
- permit selection of the correct amplitude and frequency combination to perform any classification job
- create a live action over the whole screen, without dead spots

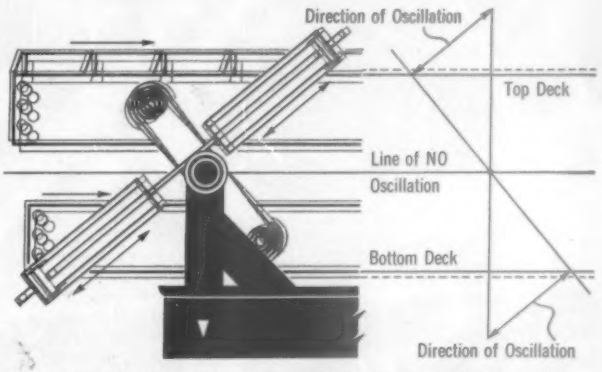
THEY REDUCE YOUR COSTS because they

- permit the lowest possible cost for supporting structures
- cut headroom requirements through their horizontal design
- cut power costs as much as 50% since there is no waste in vibrating the frame
- have longer screen cloth life because materials do not slide on the cloth

To find out how Binder System vibratory screens and conveyors can improve your operations, write us.



No matter how you look at this Binder System vibratory screen, you won't find any dampeners of any kind on the frame. There are none.



This is the Binder System: The screens vibrate as vigorously as the job requires, the frame stays absolutely still, and there are no dampeners of any kind between frame and foundation.

COMCO

CORPORATION 5421 Lancaster Ave.
Philadelphia 31, Pennsylvania

Rheax System Classification and Dewatering Plants
Binder System Vibratory Screens and Conveyors

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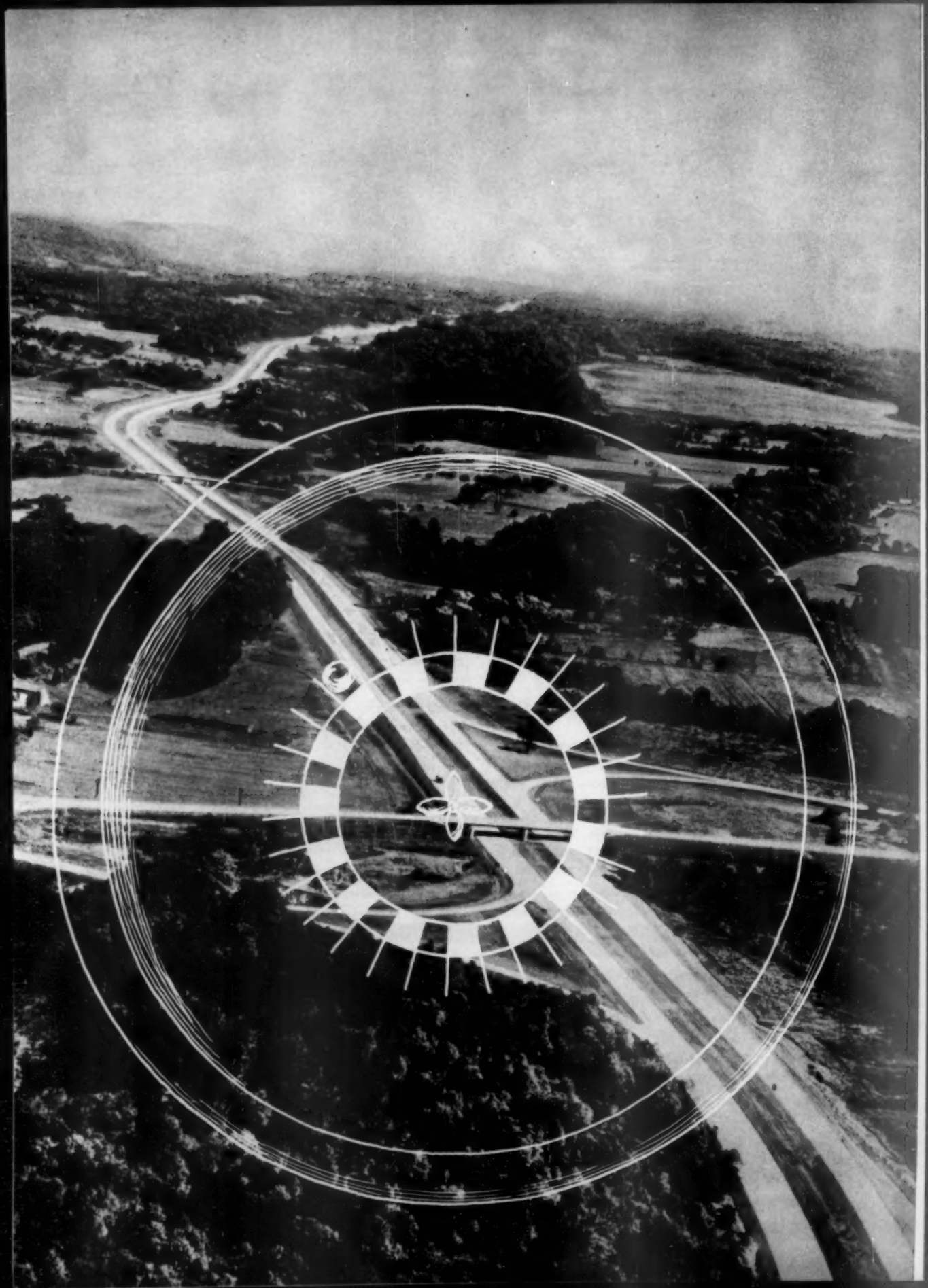

Part 2*

ROCK PRODUCTS

May 1961

ROAD PROGRAM ROULETTE...

Its future rides on the findings and interpretations of three vast and complicated studies

by Joseph N. Bell

THREE VAST AND COMPLICATED STUDIES were authorized by Congress in 1956 under the terms of the Federal-Aid Highway Act. These were to be compiled by the Department of Commerce to provide Congress with sufficient information to effectively legislate our highway programs.

Of the three reports due in January 1961 to Congress by the Secretary of Commerce, only one —the Cost Estimate for the Interstate System— was actually completed. A second, the Highway Cost Allocation Study, was about three-fourths completed, with final figures promised in June. The Size & Weight Study was represented by an "interim report" which said practically nothing. This completed study is promised for midsummer.

A summary of the reports would develop these major points:

► If Congress expected a pat new program of highway financing from the BPR, it has been sorely disappointed. The BPR studies have developed the raw material—and not all of that—and nothing more. Congress must do the rest.

► The BPR's 1958 revised cost estimate of $41 billion for the Interstate System was corroborated by its new estimate of slightly over $40 billion, presented to Congress in January 1961. It seems fairly safe to presume that this will be the total cost of the Interstate System package.

► Cost allocations are not yet completed, but these are the indications:—About 5½ percent of the cost of the Interstate System will be charged to non-highway users.

—New cost allocations will probably hit the trucking industry with a much larger share of the highway burden than it is presently carrying.

► The Size & Weight Study has been delayed until midsummer, pending analysis of some 200 million individual items of data developed from the two-year Illinois AASHO Road Test.

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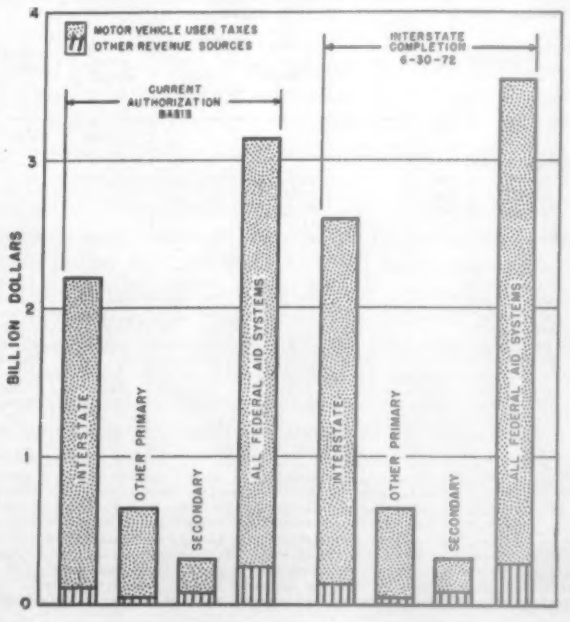
Table A—Allocation of highway trust fund revenues in calendar year 1964, according to two alternative financing programs



*This is the second in a series of four articles dealing with the Federal-Aid Highway Program; see, also, Part I, *Will Congress resolve money troubles on the interstate system?* April 1961 ROCK PRODUCTS, p. 80

ROAD PROGRAM ROULETTE . . .

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Now let's take a more detailed look at the three BPR studies as they were turned over to Congress early this year:

Part 1, Highway Cost Allocation Study, is probably the most important—and the most urgently needed—of the three BPR studies underway. The root of our present highway difficulties is financing, and this report is an effort to collect a vast array of economic data on which an equitable system of financing our federal aid highways can be based. The Interstate System hangs almost in limbo, awaiting action on this report. It can progress as it should only when a whole new set of financial underpinnings are provided for it. This was the hope and expectation of the Highway Cost Allocation Study.

Did it measure up? The answer to this question depends on your point of view. To those who expected the study to provide some magical formula for solving the financial problems of the Interstate System, the answer must be, "No." But BPR officials insist that this was not the intent of the study.

"When Congress called for this study," one top BPR official told me, "it wanted information on what costs—or benefits—are assignable to users and non-users of highways. And it wanted to know how to divide benefits among various classes of vehicles. Our job was simply to provide the raw material, and this we have done. Congress must interpret it into law."

The stated purpose of the Cost Allocation Study was to provide a statistical basis for "an equitable distribution of the tax burden among the various classes of persons using the Federal-aid highways or otherwise deriving benefits from such highways." (See Table A)

When the final report was submitted to Congress by the Department of Commerce in January, the data were not complete. Four methods were used to determine the statistical results. One method is missing—the incremental study based on figures developed in the AASHO test. These results will not be available until summer. Missing too, is the average of the four methods, which will probably serve as the final guide in allocating costs. BPR officials do not expect the results of the fourth study to change materially the indications already apparent from the first three methods now compiled.

The Cost Allocation Study breaks down into two parts, which must be considered separately.

1. Benefits to Non-Highway Users. Following are some of the specific non-user benefits labeled and assessed in the study:

Table B—Range of required payments to highway trust fund by selected motor vehicles in private and for-hire services combined, according to findings of the highway cost allocation study, compared with estimated contributions at existing rates

Type of vehicle	Kind or symbol	Type of fuel	Registered gross weight 1/	Annual travel	Range of required payments based on study findings				Estimated 1964 contribution to highway trust fund at existing rates	Indicated adjustment in contribution per year	
					Per mile of travel 2/		Per year				
					Low	High	Low	High		Low	High
			Pounds	Miles	Cents	Cents					
Passenger cars:											
Passenger car (No. 1)	Very light	Gasoline	2,209	9,000	3/	3/	3/	3/	$15.74	-	-
Passenger car (No. 2)	Medium	Gasoline	4,413	9,500	0.204	0.292	$19.38	$27.76	28.19	-$8.81	-$.43
Passenger car (No. 3)	Heavy	Gasoline	5,575	11,000	3/	3/	3/	3/	40.39	-	-
Intercity bus (No. 14)	2D	Gasoline	26,000	70,000	1.007	1.958	704.90	1,370.60	540.66	+164.24	+829.94
Trucks and combinations:											
Pickup (No. 4)	2	Gasoline	5,000	9,000	.206	.312	18.54	28.11	32.94	-14.40	-4.83
Stake (No. 5)	2D	Gasoline	15,000	12,000	.408	.511	48.92	61.32	67.51	-18.59	-6.19
Van (No. 6)	2D	Gasoline	19,000	15,000	.461	.631	69.19	94.65	94.48	-25.29	+.17
Dump (No. 7)	3	Gasoline	40,000	30,000	.680	1.504	203.95	451.20	423.13	-219.18	+28.07
Tractor-semitrailer (No. 8)	2-S1	Gasoline	40,000	40,000	1.097	2.075	438.98	830.00	405.46	+33.52	+424.54
Tractor-semitrailer (No. 9)	2-S2	Gasoline	55,000	60,000	1.263	2.926	757.67	1,755.60	724.08	+33.59	+1,031.52
Tractor-semitrailer (No. 10)	2-S2	Diesel	55,000	60,000	1.263	2.926	757.67	1,755.60	613.05	+144.62	+1,142.55
Tractor-semitrailer (No. 11)	3-S2	Diesel	62,000	70,000	1.550	4.491	1,084.70	3,143.70	820.62	+264.08	+2,323.08
Tractor-semitrailer (No. 12)	3-S2	Diesel	72,000	70,000	1.550	4.491	1,084.70	3,143.70	880.77	+203.93	+2,262.93
Tractor-semitrailer and full trailer (No. 13)	2-S1-2	Diesel	76,000	70,000	.390	5.076	273.26	3,553.20	920.96	-647.70	+2,632.24

1/ Selected as typical registered gross weights for the vehicle types listed.

2/ The required payment per mile of travel is based on the total travel on all systems by the vehicle group of which these vehicles are representative, although the total required payment for the group is a statement of its cost responsibility for the Federal-aid systems only.

3/ Required payments were not developed separately for light and heavy passenger cars.

Note:— The required payments indicated in this and other tables are based on the allocation to motor vehicle users, (see Part III H) of responsibility for 94.6 percent of Interstate System costs, 92.6 percent of Federal-aid primary highway costs, and 71.6 percent of Federal-aid secondary system costs. For all systems the percentage is approximately 92 percent, and consequently, if the user were to be assigned responsibility for the entire Federal-aid highway cost, the required payments would be increased by approximately 8 percent. Similarly, if the assigned user share of Federal-aid highway cost responsibility were a lower percentage, the required payments would be reduced in approximate proportion.

• Increasing land values. ". . . . In the vicinity of major urban and suburban highway facilities, significant land value increases are generally associated with conversion of land to more productive uses . . . . The improvement of roads through farm lands also increases values . . . . No direct mechanism exists for exacting from these beneficiaries a share in the Federal financing . . . ."

• Reorganization benefits. "Highway-induced reorganization of land use makes possible the realization of industrial, mercantile and service economies in the form of: larger and more widely spaced plants, scientifically designed, with ample space for customer and employe parking, as well as loading and unloading; access to wider or more advantageously situated markets; reduced inventories; and more efficient warehousing arrangements and practices."

• Employers and employes ". . . . benefit from the effects of highway improvements on employment and labor conditions . . . ."

• Public and institutional services are also benefited ". . . . by highway improvements which permit efficiencies and economies in operation that could not otherwise occur. . . ."

These rather amorphous benefits pose problems. "Measurement of the cost responsibility of non-user beneficiaries," points out the report, "is complicated by the fact that benefits accruing to non-users are, in large part, transfers of benefits realized in the first instance by highway users . . . . These answers are ultimately matters of policy."

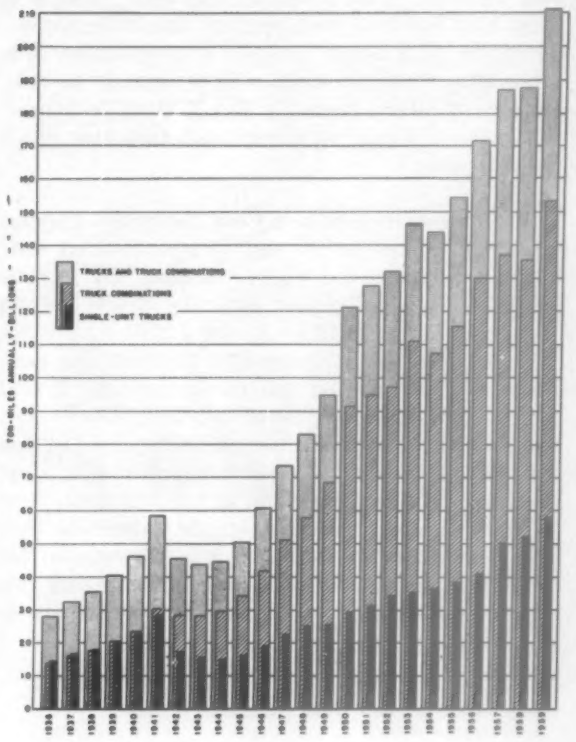
In spite of the difficulties, however, the BPR comes out with a flat non-user assessment which, presumably, could or should be raised from some method other than direct user taxes. Says the report: "The net result is the assignment of approximately 8 percent of the tax burden to revenue sources other than taxes on motor-vehicle users. The largest percentage assignment to other sources, 28.44 percent, is that applied to the Federal-aid secondary system. The assignment to the Interstate System is 5.37 percent, and that to other primary highways, 7.41 percent."

2. Allocation of Tax Support Among Highway Vehicles.

This portion of the study was an effort to solve the problem of allocating the motor-vehicle share of the Federal-aid highway tax burden among vehicles of differing dimensions, weights and specifications. As mentioned earlier, results were arrived at by four methods, three of which are completed with the fourth to follow in mid-summer.

The impact of this study can best be illustrated by examples of the tax payments that would be required of a selected group of vehicles of different types and sizes, as shown in Table B. The high and low values, as determined from the results of the three allocation methods, are given for each vehicle. Determination of the final figure will require adding the incremental method, then taking an average of the four figures.

Table C—Truck and truck-combination ton-mileage on main rural roads, years 1936 through 1959



The returns aren't all in yet. But the implications are clearly ominous to the trucking industry. Says the BPR report: "It must be borne in mind that a general increase in the revenues of the highway trust fund is needed for the adequate financing of the Federal-aid highway program . . . . Even so, there is a definite indication in the results of all three allocation studies that the heavier trucks and combinations (particularly the latter) should be paying considerably more, in relation to the payments by the lighter vehicle groups, than they do now." (See Table C)

The crucial step is still to be taken. It is to mold this four-year accumulation of data into a viable,

Please turn page

ROAD PROGRAM ROULETTE . . .

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equitable method of financing the Interstate Highway System. A BPR official told me: "Congress must now find how to implement this information. This will be a tough job and a complicated one, since all sorts of pressures will be brought to bear by special interest groups. But it must be done—and soon. If Congress doesn't act this year, we'll be in trouble."

The second report is a Cost Estimate. Federal highway legislation requires a periodic cost estimate for Federal-aid highways from the Bureau of Public Roads. The cost estimate turned over to Congress by the BPR in January 1961 covers appropriations for the years 1963 to 1966. The next cost estimate will be due in January 1966, and estimates will be prepared annually thereafter. Where the other two BPR studies discussed in this article are one-shot, long-range studies, the Cost Estimate is a recurring and short-term study.

The first Cost Estimate on the Interstate System was made in 1955 and was responsible for much of the financial woe presently engulfing this plush network of roads. It was hurried and vastly inaccurate.

Table D—1961 Interstate System cost estimate by state (in thousands of dollars)

State	Preliminary engineering	Right-of-way	Construction	Bond project and advanced construction project obligations	Subtotal	Amounts already available (from table 2)	Estimated Federal-aid and State matching money required to complete system
Alabama	8,425	70,500	594,730	.....	673,705	141,901	531,804
Alaska	.....	.....	.....	.....	.....	.....	.....
Arizona	17,150	38,518	388,219	.....	441,927	80,952	361,005
Arkansas	778	13,043	326,417	.....	340,235	71,184	269,051
California	97,222	646,376	2,229,551	.....	2,976,149	517,637	2,458,512
Colorado	13,233	21,822	302,743	.....	337,808	56,866	340,942
Connecticut	11,296	92,125	340,479	.....	454,900	91,805	363,097
Delaware	3,980	5,367	305,859	.....	315,916	120,121	95,795
Florida	12,734	105,101	435,847	.....	550,682	126,140	553,542
Georgia	5,500	26,529	662,300	.....	694,407	172,450	472,971
Hawaii	7,000	55,612	155,970	.....	218,581	13,750	201,831
Idaho	4,582	15,500	165,350	.....	187,982	67,154	120,828
Illinois	34,418	136,915	1,366,706	39,940	1,617,988	276,758	1,341,230
Indiana	10,000	91,080	750,771	.....	849,450	208,716	636,729
Iowa	5,821	42,313	269,904	.....	377,038	52,313	325,315
Kansas	6,714	27,698	230,135	.....	273,547	74,212	199,335
Kentucky	7,000	48,771	383,662	.....	439,433	115,003	324,430
Louisiana	13,403	98,344	703,992	.....	879,738	137,089	742,667
Maine	5,348	6,256	185,234	.....	101,730	60,241	121,489
Maryland	12,163	107,086	350,941	.....	940,210	169,000	471,160
Massachusetts	19,758	166,997	353,052	.....	709,777	159,988	500,959
Michigan	31,000	260,519	948,752	3,460	1,221,171	219,346	1,001,825
Minnesota	11,000	128,532	647,700	.....	788,011	122,866	665,145
Mississippi	2,708	17,263	289,409	.....	309,302	76,840	312,552
Missouri	16,574	131,026	665,601	.....	814,411	156,795	657,616
Montana	3,905	31,230	314,852	.....	350,070	109,513	240,557
Nebraska	5,000	13,823	209,000	.....	225,922	75,613	150,309
Nevada	2,926	2,555	170,427	.....	175,908	46,260	129,598
New Hampshire	5,177	7,454	142,268	.....	154,999	36,742	118,257
New Jersey	19,458	190,994	912,149	.....	1,121,591	451,725	670,456
New Mexico	10,705	21,872	290,040	.....	322,617	65,922	256,695
New York	27,462	276,256	1,809,721	.....	2,113,439	895,151	1,218,288
North Carolina	1,227	28,200	210,779	.....	251,214	70,964	180,250
North Dakota	1,726	7,504	130,760	.....	140,047	26,268	113,654
Ohio	66,475	480,453	1,353,500	103,213	2,004,741	249,998	1,754,743
Oklahoma	5,817	56,866	208,991	.....	271,376	62,046	209,330
Oregon	11,283	89,426	425,710	22,530	557,923	111,356	446,577
Pennsylvania	36,132	179,316	1,423,618	.....	1,639,066	488,979	1,150,087
Rhode Island	3,719	26,345	92,928	.....	122,992	28,052	94,940
South Carolina	5,300	19,886	241,315	.....	266,512	44,985	221,527
South Dakota	1,092	5,000	217,429	.....	223,598	54,719	168,880
Tennessee	14,239	116,423	699,816	.....	830,468	182,527	647,981
Texas	31,000	210,422	1,100,050	.....	1,436,472	267,137	1,163,336
Utah	10,904	21,880	392,718	.....	425,502	53,278	372,224
Vermont	2,480	6,695	225,335	.....	233,510	56,285	177,583
Virginia	33,174	122,816	965,982	.....	1,121,952	340,498	781,454
Washington	14,703	80,303	517,999	19,941	632,406	96,513	535,893
West Virginia	11,707	80,902	445,782	.....	511,499	124,404	387,095
Wisconsin	600	39,178	293,378	.....	333,456	86,060	227,344
Wyoming	4,488	3,248	302,565	.....	309,906	63,060	246,846
District of Columbia	8,587	120,204	280,126	.....	437,997	66,204	369,793
Total	701,840	4,814,822	27,377,982	215,519	32,908,736	7,446,821	25,461,915

Table E—Comparison of 1958 & 1961 estimates of total cost for 41,000-mile Interstate System (in miles and millions of dollars)

FIRST ESTIMATE—JANUARY 1958

	Miles
Included in the estimate: Mileage of designated system on effective date of the 108(d) estimate, July 1, 1956	38,548
Not included in the estimate:	
Mileage of system segments announced by the Secretary of Commerce, Oct. 15, 1957	1,102
1,000-mile addition authorized by 1956 act	1,000
Reserved for final system measurement	350
Total	41,000

PRESENT ESTIMATE—JANUARY 1961

Included in the estimate:	
Adjusted length of system included in 108(d) estimate	38,522
Length of 1957 system additions on established locations	952
Length of "1,000-mile" system addition on established locations	950
Length of Hawaii system	48
Subtotal	40,472
Not included in the estimate:	
Mileage reserved for specific system additions for which final location is pending	220
Reserved for final system measurement	308
Total	41,000

Item	1958 Total cost	1958 Federal funds	1961 Total cost	1961 Federal funds
1. Interstate System routes included in 1958 estimate:				
1958 estimate (38,548 miles)	$27,570	$23,900	.....	.....
1961 estimate (38,522 miles)	.....	.....	$26,646	$23,294
2. Remaining system mileage:				
1958 estimate adjusted to include 1,452 miles, excluding 1,000-mile addition	1,613	1,452	.....	.....
1961 estimate (1,528 miles), excluding 900 miles of 1,000-mile addition:				
Routes designated in 1957 (902 miles)	.....	.....	1,209	1,087
Hawaii routes designated in 1960 (48 miles)	.....	.....	216	195
Reserved for specific routes, detailed location not yet established (220 miles)	.....	.....	220	195
Held for final measurement (308 miles)	.....	.....	308	277
Subtotal	1,613	1,452	1,953	1,757
3. Routes included in 1,000-mile addition:				
1958 estimate adjusted to include the 1,000 miles	1,111	1,000	.....	.....
1961 estimate (950 miles)	.....	.....	449	404
Subtotal, 41,000-mile system	30,294	26,352	29,250	25,395
4. State highway planning and research	.....	.....	574	511
5. Public Roads administration and research	.....	.....	357	357
6. Contingencies	706	648	819	737
Grand total	31,000	27,000	31,000	27,000

"It was done in a very short period of time," a BPR official said. "The states had little information or experience, and they did not estimate accurately, especially on the 2,300 urban miles; this figure was almost pulled out of the air. At that time, it was also estimated that part of the system could be two-lane. Traffic requirements, based on faulty Census Bureau estimates, were too low. We also didn't consider sufficient local access."

Unfortunately, the entire financing superstructure of the Interstate System was constructed on this errant statistical foundation. When it was shown to be inadequate, the foundation was propped up by short term expedients that are still supporting the financing of the Interstate System. (See Tables D and E)

"It was obvious in 1957," said the same BPR official quoted above, "that our original estimate was far off. We presented a new, carefully compiled cost estimate of about $41 billion in January 1958. This was accurate. The estimate we have just sent to Congress was almost identical.

"However, Congress has taken no action on either of the new estimates. We can only portion out to the states Federal money that is actually available because of the Byrd pay-as-you-go amendment. This was set aside for two years in 1958 as an anti-recession measure, but when it went back into effect in 1960, we had to cut back on the road program. Pay-as-you-go prevents borrowing from the Treasury and, therefore, nullifies the original trust fund idea, even though our surplus built up as planned. There have been stop-gap measures since to keep us going, but the need is for a solid, long-range program based on what we now know is an accurate estimate of actual costs. Since 1958, Congress has told us to speed up work on the Interstate System, then didn't put up the money. So we've had both a short and long term financing problem."

Admittedly, the fault of the original financing was the shoddy estimate on which it was based. But that has now been corrected. The new cost estimate—$11.6 billion greater than the original—is a solid foundation. It is now up to Congress to build on it—quickly. (See Tables D and E)

A Size & Weight Study is the third report. The American Association of State Highway Officials adopted its first recommendations upon vehicle sizes and weights in 1932. Since then, it has been an accepted principle that it is necessary to impose limitations on the size and weight of vehicles to preserve and protect our public roads.

It has been necessary to assess and revise these restrictions periodically to accommodate changes in highway technology, the volume of trucked goods and the physical properties of the trucks themselves. This size and weight study resulted from the 1956 directive to the Secretary of Commerce to "take all action possible to expedite the conduct of a series of tests . . . . for the purpose of determining the maxium desirable dimensions and weights for vehicles operated on the Federal-aid highways systems, including the Interstate System." (See Tables F and G)

This 1961 report entitled "Maximum Desirable Dimensions & Weights of Vehicles Operated on the Federal-Aid Systems," was quite aptly labeled an "interim report," since it gave very little information that was not already known. The 56 pages of the report (labeled "for official distribution") were padded out with several dozen charts and tables, and a considerable amount of background of the current tests in particular and size and weight restrictions in general.

Table F—Frequency of heavy gross weights of trucks and combinations, prewar and 1952 through 1959

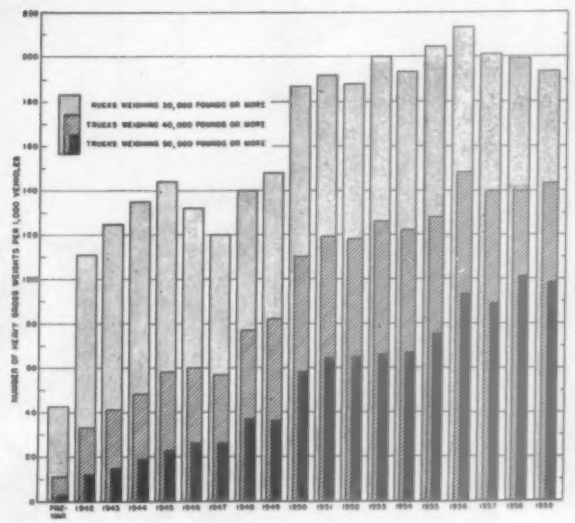

Table G—Trend in state legal maximum limits of motor vehicle sizes and weights on tandem-axle load basis

Date	Average permitted tandem-axle load[1]				
	AASHO Region				United States
	1	2	3	4	
	Lb.	Lb.	Lb.	Lb.	Lb.
1946	32,250	30,757	27,877	29,475	30,044
1951	35,091	32,338	31,238	32,133	32,620
March 1952	35,778	32,821	31,238	32,417	32,847
October 1953	35,778	32,938	31,500	32,417	32,951
November 1955	36,140	35,517	32,005	33,127	34,068
February 1956	36,140	35,698	32,005	33,102	34,087
July 1, 1956	36,140	35,165	32,005	33,102	33,953
July 1, 1957	36,140	35,165	32,312[2]	33,194[4]	34,062
July 1, 1958	36,140	35,165	32,312	33,194	34,062
July 1, 1959	36,140	35,165	32,466[3]	33,109[5]	34,060
July 1, 1960	36,140	35,165	32,466	33,109	34,060

[1]AASHO 1946 policy recommends 32,000 lb.
[2]Minnesota increased from 28,000 to 32,000 lb.
[3]North Dakota increased from 30,000 to 32,000 lb.
[4]Hawaii increased from 30,800 to 32,000 lb.
[5]Alaska included for the first time at 32,000 lb.

As Secretary Mueller said in his letter of transmittal to Congress: "It is believed that the compilation, review and analysis of the test data can be completed during the summer of 1961. It is, therefore, respectfully requested that this report be considered as an interim report with the understanding that the final report, including recommendations, will be submitted at a later date as above indicated."

The size and weight studies were conducted on

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Forbidding mountains and tropic vegetation surround the $12½ million Waianae plant of Permanente Cement Co. on the island of Oahu

Permanente Cement's new Waianae plant stakes $12½ million on 50th state's booming economy

HAWAII *LEAPS* INTO CEMENT PRODUCTION RACE

by John H. Bergstrom

THE CEMENT INDUSTRY entered the Hawaiian island economy with the suddenness of a tropical storm. The new plant of Permanente Cement Co. was the second cement plant to go on stream in as many weeks. The other, that of Hawaiian Cement Company, had begun operating only four miles away.

When the first truck load of cement pulled away from Permanente's plant, it rang down the final curtain on one phase of the company's operations in the islands. It ushered in a whole new era for the cement industry of the 50th state.

The new 1.7-million bbl. plant culminated 20 years of activity in supplying the Hawaiian building industry from mainland sources. It was Permanente cement from the firm's Pier 32 storage silos that was used to rebuild the gutted facilities at Pearl Harbor, and followed American forces across the breadth of the Pacific. The same facilities met post-war construction demands that surpassed anything ever seen before in the islands—as military construction continued and civilian construction soared to keep pace with a blossoming tourist industry.

Now, they will be used primarily to ship cement from the new plant on Ohau to the outlying Hawaiian islands and other Pacific islands as far west as Guam. Their secondary function will be to handle incoming gypsum and silica sand for the new plant.

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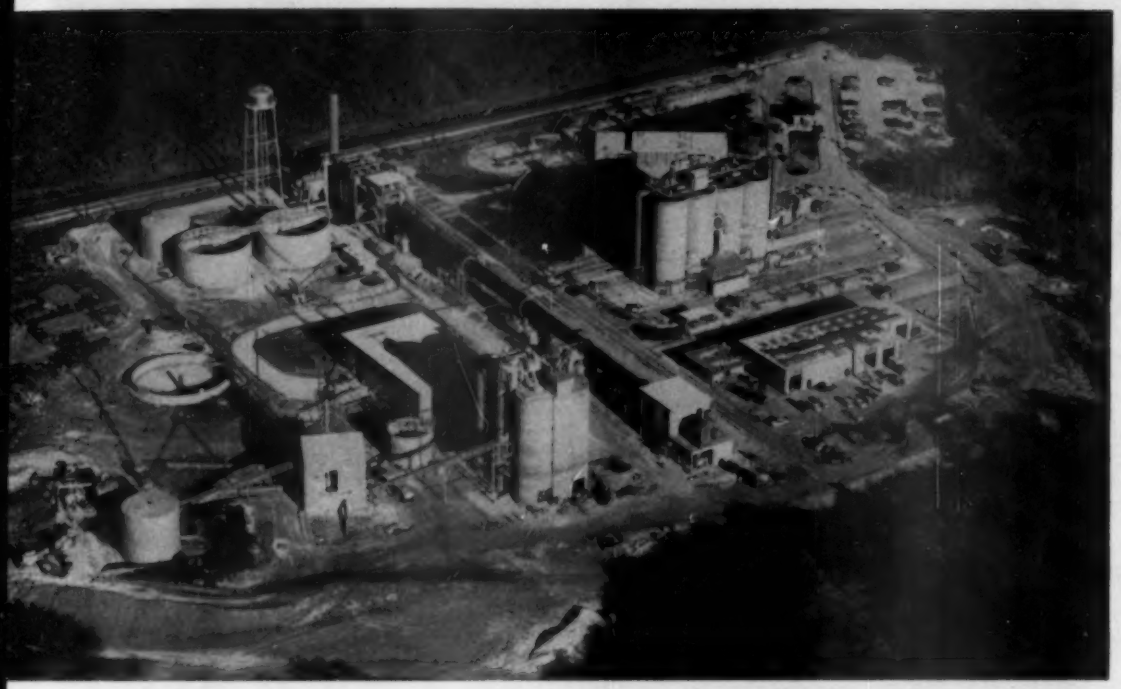
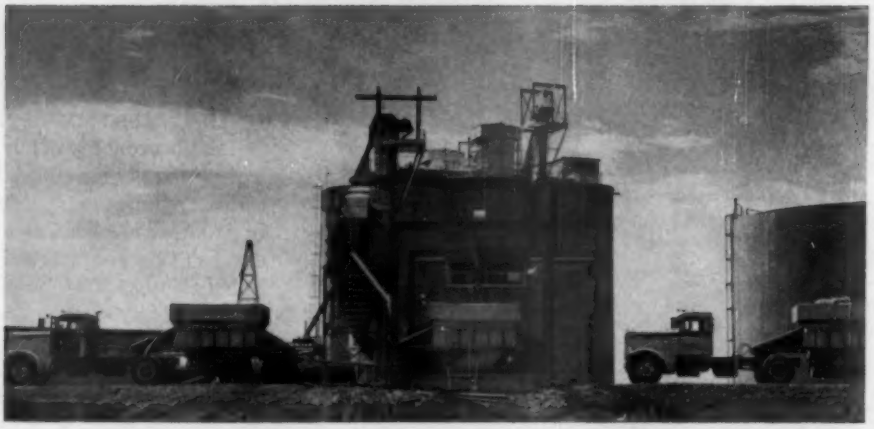
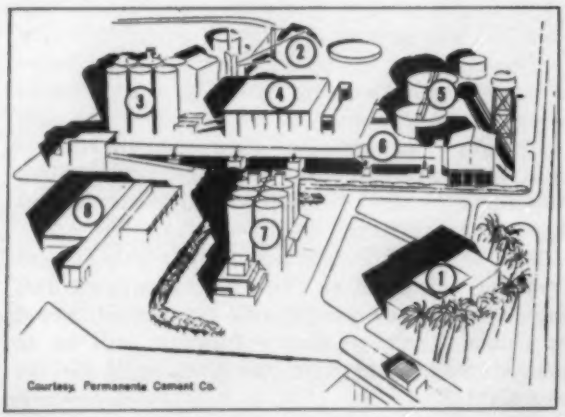


Above: The 1.7-millon bbl. wet process cement plant as it took shape in the final stages of construction during the year 1960



Right: Coral limestone is the principal raw material for the new plant. It is ripped and stripped from a deposit about 2 miles from the plant

Permanente Cement's Waianae plant is a model of straightforward efficiency and architectural simplicity



1. Office building, plant administrative center and materials testing laboratory are located here
2. Raw materials area. Coral limerock is crushed here and other raw materials are stockpiled
3. Raw storage silos. The rear bank stores crushed limerock, while the front bank holds clinker and gypsum
4. Mill building. Raw grind mill pulverizes crushed coral limerock ahead of blending. Finish mill grinds clinker into finished portland cement
5. Blending and slurry tanks. Finely ground coral limerock is blended with other additives—basalt, iron ore and silica—before the mix is pumped to slurry tanks. The wet process is a highly efficient and dust-proof method of cement making
6. Rotary kiln. Slurry is burned at 2,700 deg. F. in the 450-ft. kiln. Clinker is air-quenched while kiln dust is collected in the electrostatic precipitator. Clinker then is stored in silos (3) prior to finish grinding (4). Gysum rock is added to control setting time
7. Cement storage silos and pack house. Finished cement is pumped from mill building to silos. Bulk hauling trucks distribute cement to customers
8. Maintenance building—the repair and supply center for all plant machinery

CEMENT PRODUCTION RACE . . .

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The plant, designed and constructed by Kaiser Engineers, was put on stream for a total cost of $12,400,000—only $7.30 per annual bbl. This figure is even more amazing when the high shipping costs of bringing equipment from the mainland is considered. Some major equipment items traveled as far as 5,000 miles.

Although completely modern, highly automated and coldly efficient, the new plant has taken its place as an integral part of the islands' economy without a jarring note. This is not an accident. It is the result of careful planning with emphasis on location, plant layout, architecture, landscaping and a highly efficient dust collection system.

The plant is located on a 25-acre site in the Waianae Valley on the western coast of Oahu, 28 miles from Honolulu. Nearly hidden between two hills in this rural area, it is unlikely to spoil Hawaii's "grass shack" image for either tourists or tradition minded islanders.

The installation presents an open, spacious appearance, although it occupies less than ⅔ of its 25-acre site. The straight-line material flow from primary crusher to packhouse is partly responsible for the open look, as is the carefully planned landscaping and the use of concrete storage silos instead of open storage piles. All roads and walkways are of concrete, further enhancing its attractive appearance.

The buildings are a showcase of modern concrete construction in Hawaii. Concrete has been used wherever possible; yet in the interests of economy, all materials used are standard products of the progressive local concrete industry. The combination of bright, pleasing colors of the buildings and the exotic island foliage used in the landscaping makes the plant seem completely at home on its small corner of "paradise."

The main raw material is a soft coral limestone, which is quarried at a site two miles from the plant. A dozer rips the soft coral, which normally is loaded into four bottom-dump trailer and semi-trailer units for the haul to the plant. But when material is encountered with more than 5 percent moisture, which might impair the efficiency of material handling equipment at the plant, it is stockpiled and allowed to air dry. Coral from these stockpiles is loaded by a 3¼-cu. yd. front-end loader. Quarry production is 300 tph.

Quarry trucks discharge the limestone into a 50-cu. yd. drive-over hopper at the plant site. A vibrating grizzly feeds plus 6-in. material to the primary crusher, a 24 x 36-in. jaw unit. All minus 6-in. raw material goes to the secondary crusher station on a 24-in. belt conveyor.

A television camera mounted above the primary crusher and grizzly feeder helps in maintaining a uniform feed rate. The monitor for this unit is located at the secondary crusher station.

The secondary crusher section is enclosed in a concrete structure as a simple method of containing crusher dust. The section has two crushers—an impactor for the softer coral and a gyratory for basalt. All minus ¾-in. material bypasses the crushers over a louvered screen. Oversize from this screen drops to a horizontal vibrating feeder. This feeder is reversible and can send material to either crusher.

Basalt and silica sand also are delivered to the same drive-over hopper. Basalt, which is purchased from an outside source, usually is delivered at ¾-in., and most bypasses the crushing system. But basalt may be handled in sizes up to 4-in.

The crusher product is collected on a 48-in. reversible belt conveyor. It is moved with the minus ¾-in. screen throughs to the raw material storage silos, where it discharges into the boot of a bucket elevator. Casing for this elevator is cast integrally with the storage silo, a considerable saving over installation of conventional steel housings.

A sand plant is operated in conjunction with the cement manufacturing facility, since specification sand is scarce in this area. The minus ¾-in. limestone may be sent to the adjoining sand plant by reversing the crusher discharge belt. There, plus ⅜-in. material from the top deck of a 6 x 16-ft. double-deck vibrating screen is returned to the cement plant. The minus ⅜ x $\frac{3}{16}$-in. oversize from the second deck also may be returned to the cement plant, or it may be chuted to a horizontal stacking conveyor and stockpiled.

The minus $\frac{3}{16}$-in. throughs are collected in a bin below the 2-deck screen. A vibrating feeder delivers them to an 8 x 24-ft. sand sorting tank. Sand settling out in the tank is further washed and dewatered by a 54-in. spiral classifier.

The overflow product from both the sand sorting tank and the spiral classifier is pumped to an 80-ft. diam. thickener. Thickener overflow is returned to the sand sorting tank at the rate of 1,000 gpm. Underflow from the thickener is pumped to the raw grinding circuit at the cement mill. Total capacity of the sand plant is 160,000 tons per year.

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CEMENT PRODUCTION RACE . .

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Cement plant raw-material storage consists of six 30-ft. diam., 90-ft. high concrete silos and the two "star" bins between them. Two silos each are alloted to coral and clinker, and one each to basalt and gypsum. Silica sand and iron, when required, are stored in the two "star" bins. A bucket elevator, two 48-in. wide oscillating conveyors, and three 16-in. screw conveyors distribute coral, basalt, gypsum, silica sand and iron to the proper storage silos.

Raw mill feed comes from three sources. Coral is drawn directly from the storage silos. Preground basalt slurry is pumped from a storage tank. And additional coral is pumped to the mill from the thickener underflow at the sand plant.

Unusually large-diameter openings were provided in the bottom of the coral silos to prevent arching, since material handling tests revealed the difficulty of handling the coral at a moisture content over 5 percent. Coral discharges through the conical bottom of each silo onto an 11-ft. diam. table feeder, which sends it to a weigh belt. The latter discharges to a belt conveyor that feeds the raw mill. A variable-speed drive on the table feeder provides precise control of the material flow. Silica sand and other additives are proportioned into the mill feed by a combination of vibrating feeders and weigh belts.

Basalt must be preground because of its hardness. The raw mill, a 7-ft. 10½ in. x 39-ft., 3-compartment ball mill, was sized to perform this pregrinding ahead of the intergrinding with the coral. This proved more practical than providing a separate mill. Grinding rate for the basalt is about 30 tph. Preground basalt is stored in a 35-ft. diam. x 22-ft. high concrete basin. The tank holds enough basalt slurry for about three days' kiln operation. The slurry is pumped from this basin at a rate of about 70 percent solids for intergrinding with the coral.

Since all materials are fed to the mill on a controlled weight basis, a system was devised for weighing and proportioning the solids in the preground basalt slurry and the thickener underflow.

Both flow rates are controlled by a metering system combining a nuclear density gage, magnetic flowmeter and automatically operated pinch valve. The two meters read pounds of solids per gallon of slurry, and gallons of slurry per minute. These values are automatically integrated and compared to the preset flow rate. If adjustments are necessary, they are performed automatically by a pneumatically operated rubber pinch valve. Once the total flow rate has been set, no further adjustments are necessary to keep the required weight of material reaching the mill.

Operating at 21.8 rpm., the raw mill will grind kiln feed slurry to 85 percent minus 200-mesh, at rates up to 100 tph. Slurry is pumped through a 10-in. line to two 65-ft. diam. x 32-ft. high concrete kiln feed basins. Total capacity of the two basins is 200,000 cu. ft., enough for 6 days normal kiln operation. Each basin has a mechanical-air agitator. Two 5-in. sand pumps transfer slurry between tanks or directly to the kiln slurry feeder. Overflow from the slurry feeder is returned to the tank by a third 5-in. pump, which is located in the kiln feed tower.

Mill feed control panels are located in the laboratory, adjacent to the mill building, providing the chemist with complete control of the mix proportion. Each weigh feeder that draws dry material from the storage silos has an associated controller and recorder. The feed rate for each unit can be preset and controlled manually in single or group control. Under group control, a master controller makes proportional adjustments to each individual feeder as required. The automatic group control provides for the future installation of electronic "ears," or mill sensing devices. An automatic totalizing system adds individual feeder records. Automatic controls for weigh-feeding of the basalt slurry and the thickener underflow also are housed in this same panel. A parallel set of over-all feed controls is provided for the miller in the mill room, as are controls for pumps and conveyors.

Two television cameras and four monitors assist the chemist and miller in maintaining close control over mill feed. Both cameras are mounted over the belt conveyors under the storage silos. Monitors are located in the mill building and the laboratory.

The oil-fired kiln is 450 ft. long with a 14-ft. 6-in. diam. upper section tapering to a 13-ft. diam. lower section. The plant's single kiln has some excess capacity and was so selected to allow for future demands and yet operate efficiently at present production levels. Kiln heat-recovery equipment includes a chain system, a slurry preheater installed above the chain system, and a heat exchanger cross system below the chain section. The 5-chamber cross system is 32 ft. long and is constructed of heat resistant cast steel.

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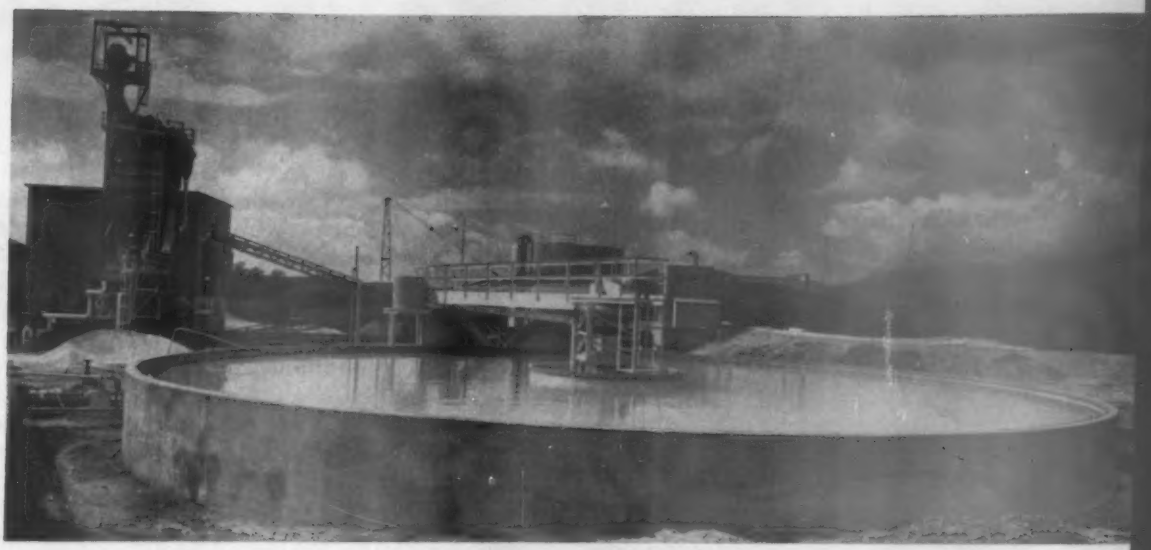

Above: An 80-ft. diam. thickener takes overflows from a sand-sorting tank and a spiral classifier. Its underflow carries minus-200 mesh fines to a mill

Left: The 14½ x 13 x 450-ft. oil-fired kiln is probably the largest piece of moving machinery ever installed in the Hawaiian Islands

A panel of controls in the laboratory lets the plant chemist regulate the amount of each ingredient in the new material mix

CEMENT PRODUCTION RACE . . .

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Although Bunker "C" fuel oil is now being used to fire the kiln, provisions have been made to use a middlings product from a nearby oil refinery, now being built. Diesel fuel is used for kiln start-up as a quick method of bringing it up to temperature. The burner is a combination unit that can operate on both types of fuel. Bunker "C" fuel is stored in a 450,000-gal. steel storage tank.

Bulk haulers can be loaded with cement at either one of two truck-loading stations at rates up to 1,000 bbl. per hr.

Kiln dust is collected in a concrete-clad electrostatic precipitator, largest unit in an extensive collection system

Three television cameras with monitors in the kiln control room give the operator additional control over the burning process. One camera is mounted near the feed-end tower. The other two view the clinker cooler floor and the clinker oscillating conveyors. The feed-end camera has remote pan and tilt controls, to allow it to view the entire feed tower and slurry tank area.

Clinker from the kiln goes into an 8 x 50-ft. horizontal air-quenching cooler, which is rated at 5,000 bbl. per day when cooling from 2,600 to 150 deg. F. The cooler is equipped with a clinker breaker, impact steel, chain curtain, automatic lubrication, and its own dust-collecting system. The cooler discharge, combined with dust collected by a multiclone, goes by oscillating conveyor in an underground tunnel to a bucket elevator that serves the clinker storage silos.

Clinker and gypsum are fed to the finish mill conveyors by weighing belt feeders. The finish mill, an 11 x 34-ft. 2-compartment ball mill, is operated at 18 rpm. by a 2,000-hp. specially designed synchronous motor. This is the largest motor of its design ever built. Its use was necessary, since starting a conventional 2,000-hp. synchronous motor under load would have created a voltage drop above that allowed by the local utility.

An 8-in. air-slide takes mill discharge to a cylindrical cement cooler. Finished cement is pumped to storage from the cooler. Total storage capacity is 130,500 bbl. in eight 90-ft. high x 30-ft. diam. silos and the three interstice "star" bins.

Two separate air-slide systems withdraw cement from the silos. One, located at the bottom of the silos, can supply material either to the packhouse supply bin or to the two bulk-loading stations. The second system, which draws material from a point about halfway up the silos, feeds only the bulk loading facilities.

All cement delivery is by truck. A graphic push-button control panel at the bulk loading station automatically controls all bulk loading operations. Each of the two 50-ton, 70-ft. long truck scales is provided with a double photoelectric cell cutoff system. It first automatically closes the silo air-slide gates and then closes the junction box discharge gates as the truck becomes fully loaded. The load-out system operates at a rate of 700-1,000 bbl. per hr.

Material flow from the packhouse supply bins and the recirculation pumps is remotely controlled

from a similar pushbutton panel located adjacent to the packers. Two 1,500-bag-per-hr. packers are available. One is for masonry cement and the other is for all types of portland cement. Sacked goods are discharged to 32-in. wide, 2-level, 3-section spring conveyors, which discharge to either of two reversible shuttle conveyors. Each of the latter, in turn, discharge the sacked product to trucks spotted on either side of the packhouse.

Unusual attention has been given to providing the best possible dust-collection system, because of the plant's location. Eleven separate dust-collecting systems make the plant one of the most dust free in the industry.

Dust collection starts with the crushing system. A 10,000-cfm. bag-type collector picks up dust from 3 points in the primary crusher area. A similar 7,800-cfm. unit draws from six points at the secondary crusher station.

Raw material storage silos are kept dust free by 4 bag-type collectors, each rated at 5,200 cfm. Two 6,500-cfm. bag-type collectors are installed above the finish silos.

Bag-type collectors also are installed at the feed end of both the raw and finish mills. A 97-in. cyclone is installed ahead of the finish mill bag house to remove coarse dust. Two bag-type collectors also are used in the packhouse.

Kiln dust is collected by a 4-compartment electrostatic precipitator, rated at 210,000 cfm. at 650 deg. F. It provides a collection efficiency of 99.6 percent for all particular matter. The dust return system consists of a screw conveyor, an elevator and a constant-head feeder located above a surge bin. That feeder discharges dust into a 140-ft. long screw conveyor, which conveys material to a kiln dust scoop located 28 ft. below tire No. 4.

A mechanical multiclone-type dust collector is available to trap clinker cooler dust.

Although productive capacity is currently far ahead of cement usage in the islands, provision has been made in order to expand the plant's capacity in the near future. END

MAJOR EQUIPMENT REFERENCE

QUARRYING & CRUSHING

Tractor and dozer, C-6	Euclid Div., GMC
Rotary drill, Air Track	Gardner-Denver Co.
Shovels, ¾, 2½-cu. yd.	Bucyrus-Erie Co.
Motor grader, No. 12	Caterpillar Tractor Co.
Trucks	Peterbuilt Motors Co.
Trailer & semi-trailer	Utility Trailer Sales Co.
Front-end loader, 3¼-cu. yd.	Clark Equipment Co.
Feeders, 350-tph.	Carrier Conveyor Corp.
Primary crusher, 36 x 24-in.	Farrell-Bacon Co.
Dust collectors	Rees Blow Pipe Mfg. Co.
Secondary crushers, impactor, 250-tph.	Pennsylvania Crusher Div., Bath Iron Works
gyratory, 100-tph.	Smith Engineering Works
Feeder spreader, 5 x 12-ft. / Oscillating conveyors (2)	Carrier Conveyor Corp.
Belt conveyors (4)	Link-Belt Co.

SAND PLANT

Belt conveyors	Kelman Mfg. Co.
Slurry pumps	Wilfley Pump Co.
Vibrating feeder, 24 x 18-in.	Syntron Co.
Thickener, 80-ft. diam.	Process Engineers, Inc.
Vibrating screen, 6 x 16-ft., 2-deck	Overstrom & Sons, Inc.
Sand classifier, 8 x 24-ft. tank, 3-comp. / Sand preparation machine, 54-in. diam. screw	Western Machinery Co.

MILL FACILITIES

Raw mill & drive, 3-comp. ball / Finish mill & drive, 2-comp. ball	F. L. Smidth & Co.
Weighing feeders, Waytrol	Jeffrey Mfg. Co.
Table feeders / Belt conveyors, 24-in. (4)	Link-Belt Co.
Slurry pumps (3)	Wilfley Pump Co.
Screw conveyors, 9-in. diam. (2)	Industrial Machinery Co. Inc.
Vibrating screens	Link-Belt Co.
Air-slide conveyors, 8-in. / Cement pump, 8-in. / Compressor	Fuller Co.
Cement cooler	F. L. Smidth & Co.
Dust collectors	Rees Blow Pipe Mfg. Co.
Slurry agitators	Process Engineers, Inc.

BURNING & COOLING

Slurry pumps, 5-in.	Wilfley Pump Co.
Rotary kiln, 13 x 14½ x 453-ft.	F. L. Smidth & Co.
Clinker cooler, 8 x 50-ft.	Fuller Co.
Dust collectors, multiclone / Electrostatic precipitator	Western Precipitation Corp.
Oscillating conveyors (4)	Carrier Conveyor Corp.
Bucket elevator	Link-Belt Co.

CEMENT STORAGE & SHIPPING

Recirculation pump, 8-in. / Air-slide conveyors, 12-in.	Fuller Co.
Bucket elevators (5)	Link-Belt Co.
Truck scales (2)	Fairbanks-Morse & Co.
Dust collectors (4)	Rees Blow Pipe Mfg. Co.
Sackers (2)	St. Regis Paper Co.
Sacker spring conveyors (2)	Power-Curve Conveyors Co.
Shuttle conveyors, bag (2)	General Conveyors, Inc.

GENERAL

Electric motors / Motor control centers	Westinghouse Electric Corp.
Switch gear	General Electric Co.
Kiln controls	Bailey Meter Co.
Raw feed control	Jeffrey Mfg. Co.
Mill liners	Electric Steel Foundry Co.
Refractories	Kaiser Aluminum & Chemical Corp.
Conveyor belting	American Rubber Mfg. Co.
Cooling tower	Fluor Products, Inc.
Engineering design & construction	Kaiser Engineers

IS THE PERCENTAGE DEPLETION SQUABBLE ENDED?

by Joseph N. Bell

Left: Senator Albert Gore (D-Tenn.)

There will be a breathing spell, but it may be of shorter duration than the industry would like or is expecting

EARLY IN 1961, the U. S. Internal Revenue Service released a ruling which read, in part: "In view of the decision of the Supreme Court of the United States in United States v. Cannelton Sewer Pipe Company, Revenue Rulings 290 C. B. 1953-2, 41, 54-109, C. B. 1954-1, 62, and 55-244, C. B. 1955-1, 73, are revoked. In the case of minerals involved in such Revenue Rulings, any process which is not necessary to bring to shipping form will not be considered an ordinary treatment process . . . . In the case of calcium carbonates and other minerals mined and used by mine owners and operators in the manufacture of cement, where a proper election is made . . . ., all processes applied up to introduction of the kiln feed into the kiln, excluding any preheating process, are includable as mining processes for certain taxable years beginning before January 1, 1961."

With only four exceptions, domestic portland cement manufacturers have elected to go along with the kiln-feed cutoff point for disputed years prior to 1961. This constitutes a clear victory for Treasury officials who have been doggedly dragging cement, brick and tile industry depletion cases through the courts for many years in an effort to obtain judicial support for the narrow Treasury definition of what constitutes an "ordinary treatment process."

In view of this ruling, based on what has become known as the Gore amendment to our percentage depletion laws, many questions of profound importance to the rock products industries in general—and the cement industry in particular—are brought sharply into focus. What precisely does the new ruling mean in the eyes of the people who will enforce it? Having won their victory, will the people in the Treasury Department now be content with the kiln-feed cutoff point, or will they attempt to push it back further?

To seek answers to these questions, and many others, ROCK PRODUCTS sent a reporter to Washington. I spent several days talking with IRS and Treasury officials competent to answer depletion questions. They spoke candidly with me on one condition—that I not quote them by name without first checking the quotes with them in writing. Because it has been this reporter's experience that most officails—particularly government officials—will back away from their spoken words when they see them on paper, the following quotations—although authoritative—will not be sourced by name. They come from an array of top administrative people in the Treasury Department and the Internal Revenue Service. They are offered here to give rock producers a straight-forward idea of precisely the type of thinking that probably will be administering Federal taxes in general—and percentage depletion in particular—in the immediate years ahead.

As a result of these conversations, three things came through rather sharply to me:

► 1. The Treasury Department regards its victory in the cement depletion case as complete and constituting an absolute vindication of all the time, effort and money expended over the past decade to press the Federal government's interpretation of "ordinary treatment process" in the manufacture of portland cement.

► 2. There is no indication that Treasury is planning to rest on its laurels, no backward look of relief that the matter has finally been settled. The attitude of the Treasury attorneys with whom I talked was, rather generally: "We had to wait much too long for this decision, which was obvious and just from the beginning. Now we can get on with our program."

► 3. Treasury is not satisfied, now that it has won its court victory and the new legislation it sought. Quite the contrary. The general tenor of IRS legal conversation seemed to regard the Cannelton decision as merely a step in a march that still has some distance to go. And indications are that the speed and distance to be covered are both likely to be stepped up under the Kennedy aegis.

"The new administration is going to be looking for loopholes to plug in the tax laws, and even the kiln-feed cutoff point may look like one to them," an IRS official told me. "Many people in the Treasury Department still feel that portland cement is getting a disproportionate share of percentage depletion—and that either cement must be pushed further back or other products will have to be brought up commensurately."

These are not particularly pleasant facts to report. Yet they represent, to an overwhelming degree, the sentiment that ROCK PRODUCTS found among the officials at the operating level of the Treasury Department. It seems decidedly import-

Please turn page

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ant that the cement industry—and allied industries, as well, that might quite likely be more deeply involved in future efforts to pare down percentage depletion—be aware of these feelings and prepared to cope with them.

There will be a breathing spell. But it may be of shorter duration than the cement industry would like or is expecting. A breathing spell, however, always provides time to re-examine the situation and re-group the forces, both offensive and defensive. There appears to be great need for this in the area of percentage depletion right now.

The background of the percentage depletion problem is well-known in the rock products industries and has been covered in detail on a number of occasions in ROCK PRODUCTS. Briefly, the events leading up to the present situation were:

—June 27, 1960, the Supreme Court of the United States flew in the face of 54 contrary lower court decisions and ruled that the Cannelton Sewer Pipe Co. was not entitled to calculate its depletion on the basis of the income from the sale of its finished product.

—June 30, 1960, Congress passed the Public Debt & Tax Rate Extension Act which established —among many other things—the pre-kiln cutoff point as the basis for computing percentage depletion in the cement industry for taxable years beginning after December 31, 1960.

—September 14, 1960, another amendment to the tax laws was enacted allowing cement manufacturers sixty days within which to elect whether they would settle their depletion controversies for all open years through 1960 on the basis of the pre-kiln cutoff, or whether they would pursue their claims at their peril in the courts.

—January 30, 1961, the IRS issued Revenue Ruling 61-17 activating the provisions encompassed in the legislation passed in September. The effect of this Ruling was simply to reactivate the old and disputed Revenue Ruling 290 which set the cutoff point at kiln-feed without specific statutory authorization until the 1960 legislation was passed.

—February 28, 1961, amended returns under the new depletion law had to be filed and deficiencies paid.

The seeming injustice of the monolithic Treasury Department simply pursuing the cement industry with an endless series of depletion cases, financed by an apparently inexhaustible supply of funds, until Treasury finally won a favorable decision seemed to disturb none of the legal minds of the government with whom I talked. Nor did two other pertinent facts: (1) that the Supreme Court had refused to review the Dragon Cement case, in which the taxpayer's position applied directly to the portland cement industry and was much stronger than in the Cannelton case, or (2) that there is considerable room for legal question as to whether the Cannelton decision applies to the cement manufacturing industry.

"All of the cases we lost prior to the Cannelton decision in our favor really didn't mean very much, one prominent IRS attorney told me. "Court decisions pyramid. After the first decision for the taxpayer in a cement depletion case, other judges frequently just followed this precedent. The Supreme Court declined to step into these earlier cases because they weren't considered important enough. When the Supreme Court finally did hear such a case, it ruled unanimously in favor of the government."

The feelings of many cement producers were rather well summed up by Joseph S. Young, president of the Lehigh Portland Cement Co., who told the Boston Society of Security Analysts recently; "The outcome of our tax controversy was a bitter disappointment. It does, however, at long last make certain the tax formula upon which our earnings for the past 10 years, as well as for the future, shall be determined. Moreover, the basis for settling the years in dispute and the statutory provisions for computing depletion allowances after 1960, closely reflect the position taken by the Treasury Department in its Revenue Ruling No. 290 promulgated in 1953.

"We can take some satisfaction from the fact that we were not harmed by our efforts to obtain the greater allowance to which many Federal courts, other than the Supreme Court of the United States, said in effect we were entitled. To be sure, we relinquished a claim for substantial refunds, but we are no worse off taxwise than we would have been had there been no altercation about the Treasury Department's ruling."

Most cement companies shared similar experiences and similar reactions. Only a few had paid on the end product basis and had not set aside some sort of reserves pending conclusion of the depletion dispute. These companies were the hardest hit financially.

Considerable amounts of money are involved in the cutoff point dispute. According to the IRS, the $10 to $14 per ton end product depletion base for portland cement is reduced to about $3.80 per ton at the kiln. It would be further reduced to $1.50 per ton if pushed back to the quarry floor. Stated another way, the end product depletion of $1.50

per ton of raw materials is reduced to about 50¢ at the kiln and about 22½¢ per ton at the quarry. This is an economic club of considerable magnitude to hold over the heads of angry producers, many of whom regard the new law as inequitable. Yet, within 60 days of the enactment of the Gore amendment, the cement companies were required to make a clear election on percentage depletion based on the following alternatives written into the new law:

1. Kiln feed was firmly established as the cutoff point for figuring all future percentage depletion on portland cement.

2. Cement producers were given the option of (a) electing the new legislation retroactively to all previous years under dispute or (b) taking a chance, by refusing this course, that if they lose to the IRS, they might be driven back beyond the kiln-feed point by terms of a final settlement. On the other hand, they might also win end product depletion for all open years—depending on how the courts rule in each individual case.

3. After January 1, 1961, the kiln feed cutoff point is fixed by statute for all cement producers in the U. S., and there can be no more debate on this point until or unless the statute is changed.

This election has to be made by November 15, 1961. There were only four cement manufacturing companies that declined the kiln-feed cutoff for open years and chose, instead, to fight the matter out in court. According to IRS attorneys, two of the contesting companies now in litigation with the Federal government on this point are the Portland Cement Co. of Utah and Monolith Portland Cement Co. The IRS declined to give the names of the other two companies.

This was an agonizing decision for many cement company officials to make. Because of economic necessity, they elected the kiln-feed cutoff option for open years while still believing strongly in the righteousness of their previous position.

Treasury officials, in the meantime, have been enjoying their new position. One of them told me: "If producers elect the kiln-feed for open years, it settles the cutoff point both ways. Once they make that choice, they can then litigate on the amount of depletion, but not on the cutoff point. On the other hand, those who have elected to fight for a more generous depletion for the years prior to 1961 may find themselves driven clear back to the quarry floor."

They may also, it should be added, find themselves enjoying end product depletion. This the courts must decide in each individual case.

Only the three top officials of Treasury who were directly involved in depeltion in the minerals industries went out with the change in administration. They were Undersecretary Fred Scribner; General Counsel David Lindsey, and Assistant to the Secretary and head of the legal staff, Jay Glassman. All the rest of the IRS legal lights who have been closing in on the rock products industries are career employes still at the same stand.

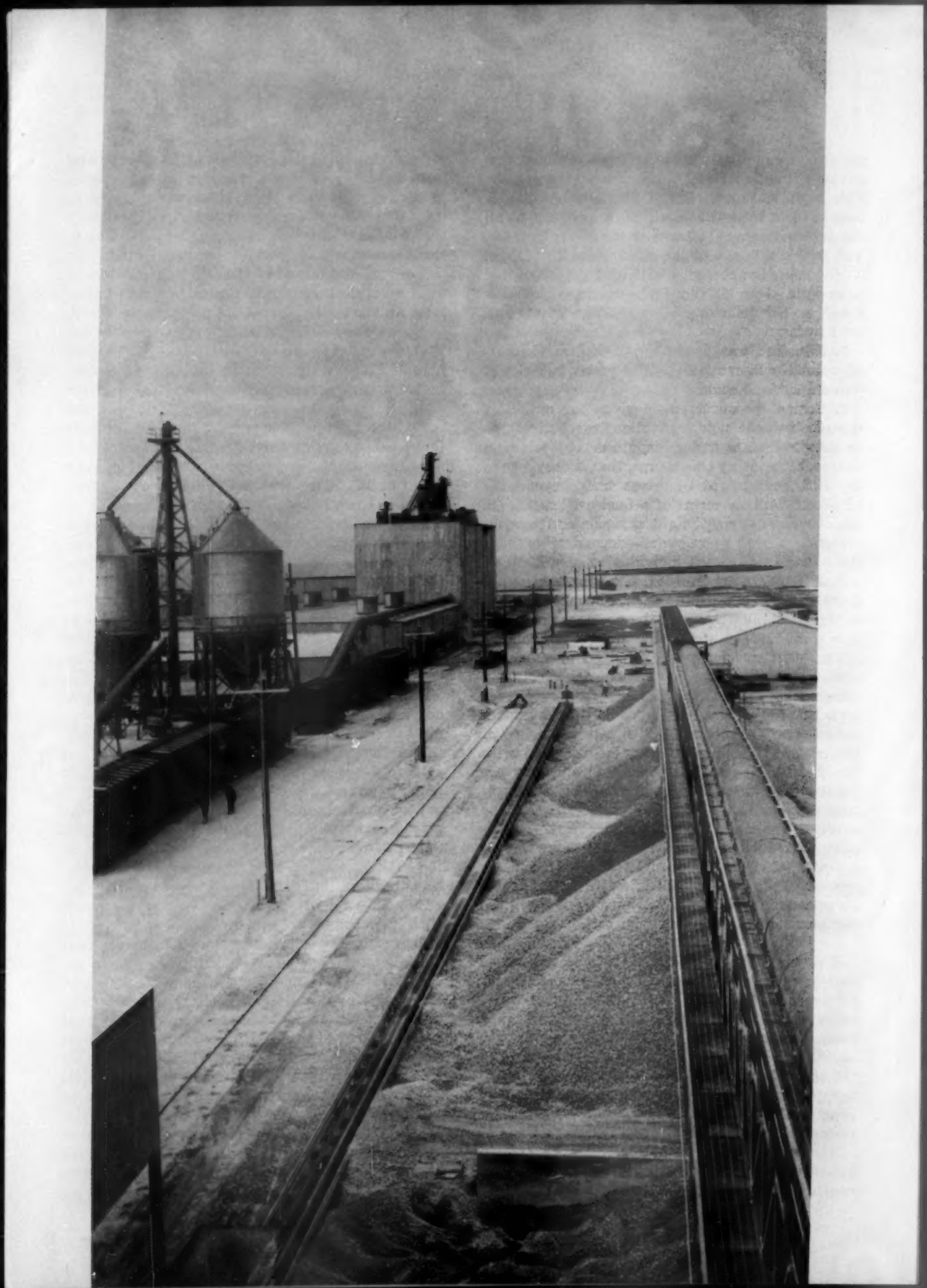
"But we're not enemies of the people," said one Treasury official, almost wistfully. "We're just here to enforce the laws. In the case of cement industry depletion, we felt all along that we were right, and we kept plugging away at it until the issue became important enough that the Supreme Court would agree to consider it. So, after losing a good many cases, we finally won the big one. As a result of the Supreme Court ruling in the Cannelton case, I can tell you that many of the people in the Justice Department feel that depletion should be allowed on cement rock only as it emerges from the mine—or perhaps at the primary crushing state. Justice probably would have pursued depletion from that standpoint had not the Gore amendment been enacted to specify kiln-feed as the cutoff point.

"The present feeling around here," he concluded, "seems to be that the Justice Department will follow-up the Cannelton decision in allied industries not immediately affected—and that the government is confident it can win in other areas as well. Of one thing I can assure you: Having finally won a basic decision, the Federal government is not going to go backward."

Rock products industry representatives close to this situation are quite aware of the perils. John Sapienza—Washington attorney who is one of the nation's leading experts on percentage depletion in the minerals industries—told me wryly: "They have the bit in their teeth and are running with it. Nobody knows where they'll stop."

Indeed, no one does, not even the government officials most closely involved. But they have unquestionably, at the moment, come to a pause. Whether they are stopping merely to catch their breath from a decade of chasing an elusive cutoff point remains to be seen. But it certainly behooves the cement industry to marshall its forces during this breathing spell to cope with the next attack.

Because, almost certainly, there will be such an attack. How soon it will come and on how far-reaching a front, no one really knows. But come it will. And the cement industry—indeed, all of the rock products industries—should be prepared to meet it with the best possible weapons. END



Big kilns and huge tanks process seawater to yield periclase, vital new material for basic refractories

Dolomite unlocks magnesia from the sea

by Elwood Meschter

SEAWATER yields exceedingly pure magnesium oxide at the new Pascagoula, Miss., plant of H. K. Porter Co., Inc. Dolomitic limestone is the key that unlocks the valuable magnesia—intermediate product in the process. And in the reaction, the dolomite releases its own magnesium oxide, adding greatly to the efficiency of the process.

Mississippi's Gulf Coast is a strategic location for Porter's $12-million installation, first integrated refractory brick plant in the South. The site on Bayou Casotte provides seawater with a constant and predictable amount of magnesium salts. Dolomitic limestones are abundant throughout Alabama and can be shipped economically by rail to the Pascagoula plant. Basic refractories made from magnesium oxide, either chemically-bonded or fired, and refractories made with mixtures of periclase and imported chrome ore, can be shipped far inland to industrial centers by barge.

More than 450 tons of limestone are consumed every day to precipitate the magnesia from 50,000 tons of seawater brines. The daily yield from this feat of chemical engineering is 125 tons of periclase—a dense, fine-grained form of magnesium oxide. Periclase is the major raw material in Porter's extensive line of basic refractories, particularly important and useful in both metal refining and non-metallic mineral processing.

Two parallel processing reactions are going on at the same time in the big plant. Seawater is surging through seven tanks as water conditioning, lime reacting, solids precipitation and magnesia washing steps succeed each other. Solid materials are calcined in three big kilns. One makes soft-burned, highly reactive dolomitic lime (dolime), while the other two kilns operate in series to process the magnesimum hydroxide extracted from the seawater. These two kilns are an innovation that lets the operators control magnesia drying and magnesium oxide burning independently of each other. The more conventional technique

Please turn page

Left: From first to last—dolomitic limestone is stored under the conveyor system at the right, while the two silos at the left hold the finished periclase

Right: Stored dolomite is reclaimed into a traveling hopper, screened and crushed, and then returned to stockpiles of sized rock

DOLOMITE UNLOCKS MAGNESIA . . .

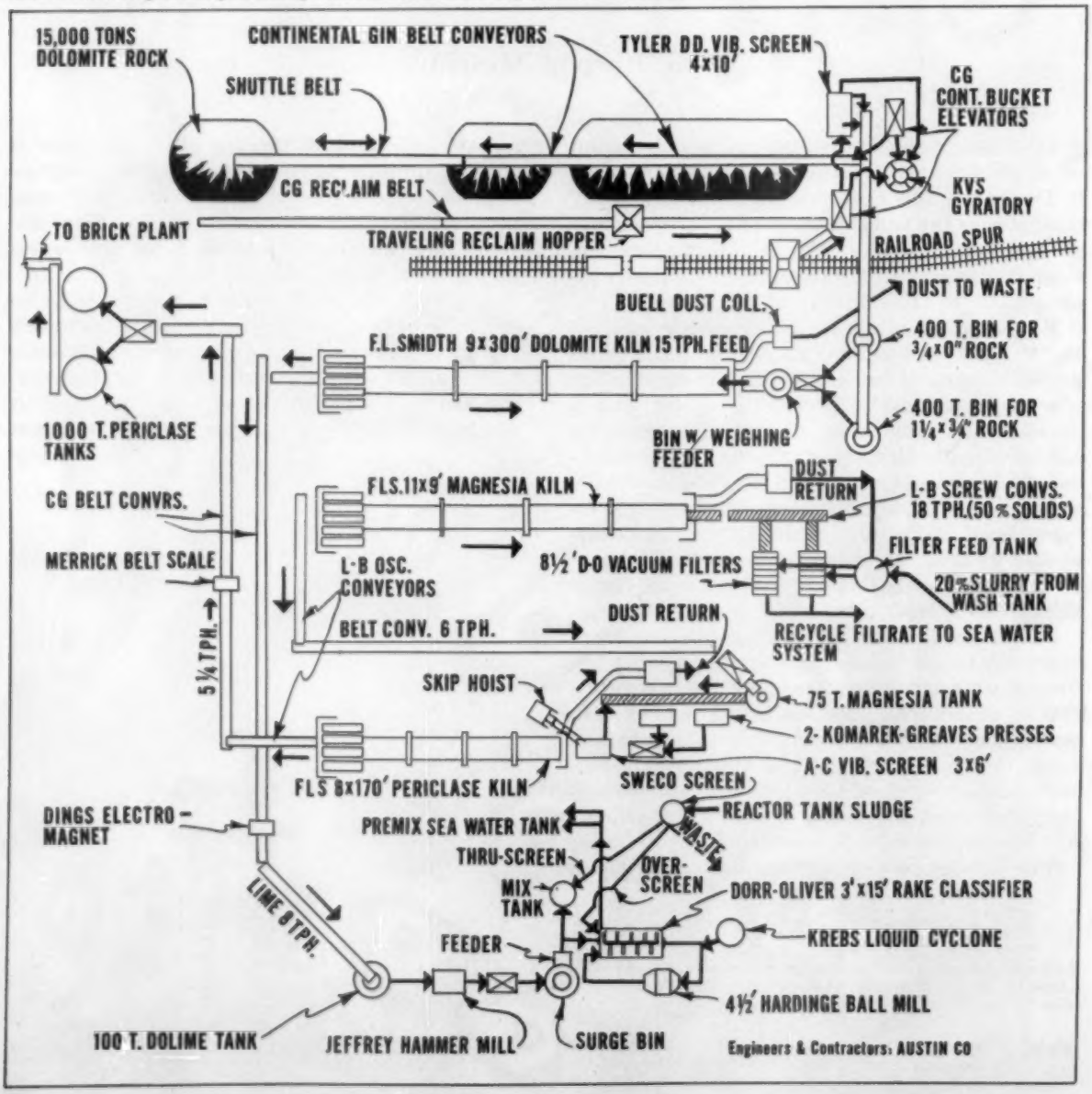
continued from page 113

has been to perform these steps in a single, large kiln that demands great skill and close attention from the operators.

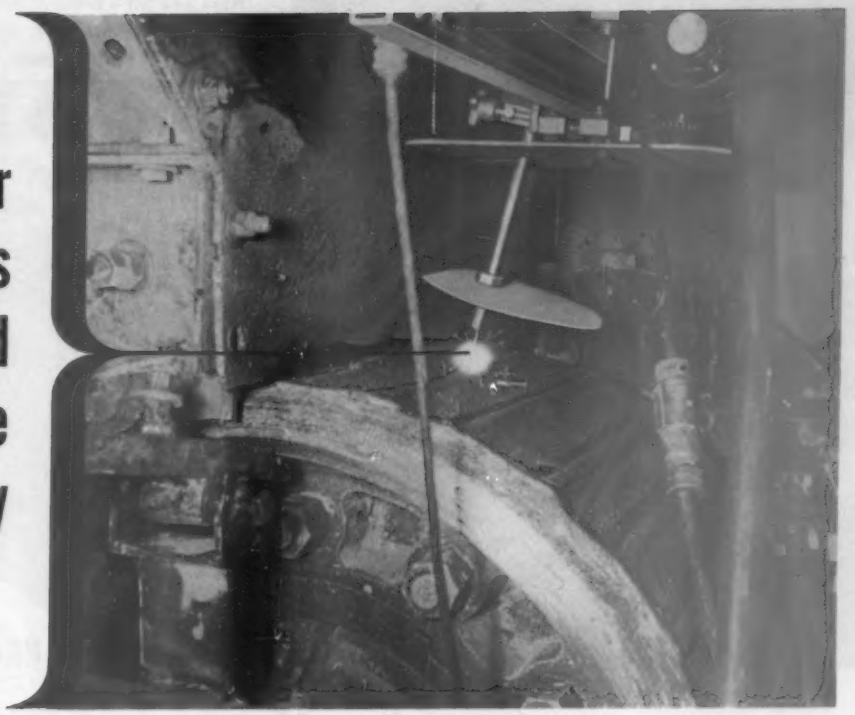
Lime making is the first step in the long, complex process. Dolomitic limestone that meets exacting chemical specifications is stocked out by size. About 15,000 tons of rock is sorted into three piles—one holds 2½ x 1¼-in. dolomite, another 1¼ x 0 and the largest pile, all unsized material.

Normal operation of the lime-burning kiln calls for a mixture of 1¼ x ¾ in. and ¾ x 0 rock that averages about 61 percent calcium carbonate, 38 percent magnesium carbonate and less than 1 percent silica and trace compounds. A screening and crushing circuit at the rail car unloading station processes incoming rock, or rescreens and recrushes dolomite reclaimed from any of the storage piles. *Please turn to page 117*

One of the two parallel processing reactions uses three big rotary kilns for solid materials



crusher rolls restored to size automatically



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Crushermatic takes the work out of welding—takes the weldor out of the crusher! All necessary controls are *outside;* the weldor works in clean smoke-free air, in comfort.

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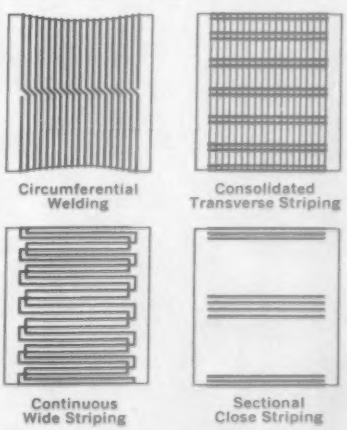

Electronic controls in the Crushermatic unit permit a wide variety of welding patterns, producing virtually any desired bead spacing. The illustrations show typical possibilities.

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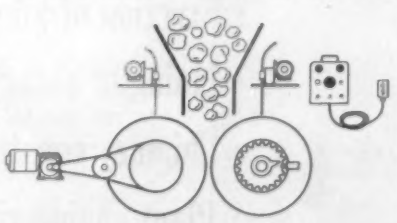

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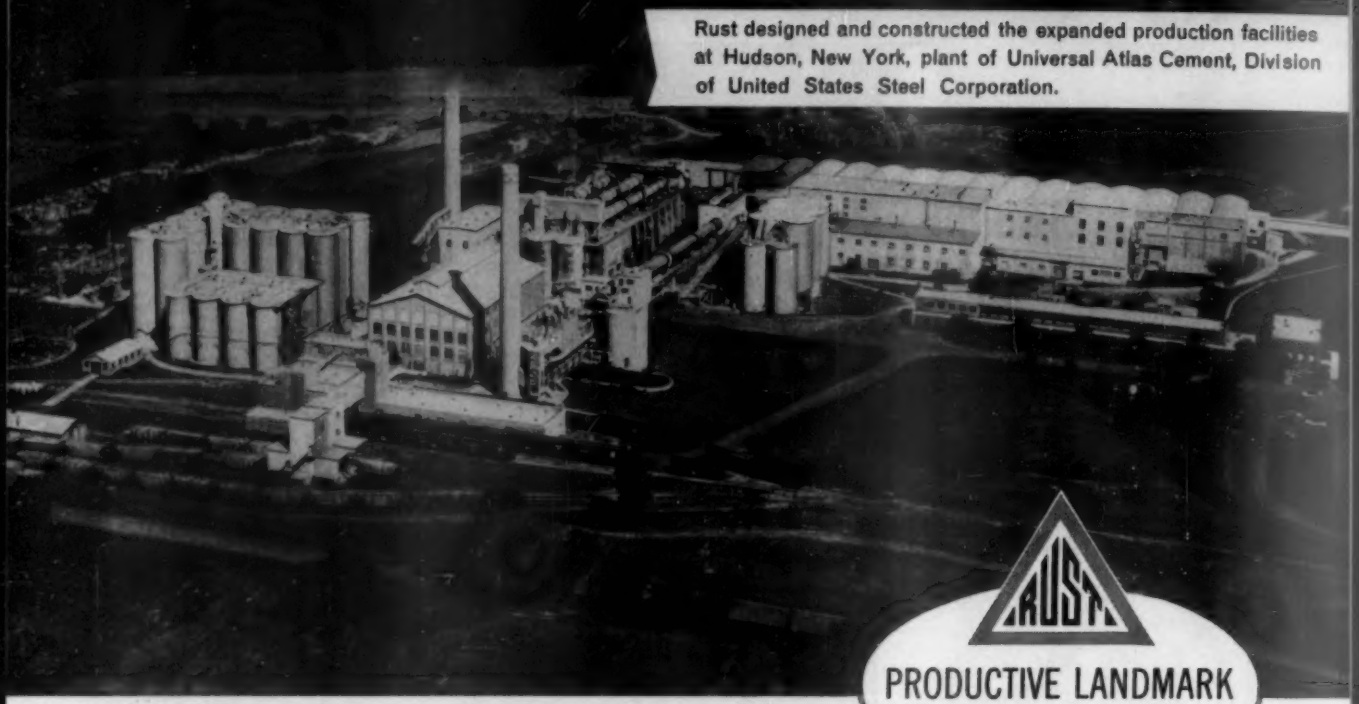

Rust designed and constructed the expanded production facilities at Hudson, New York, plant of Universal Atlas Cement, Division of United States Steel Corporation.

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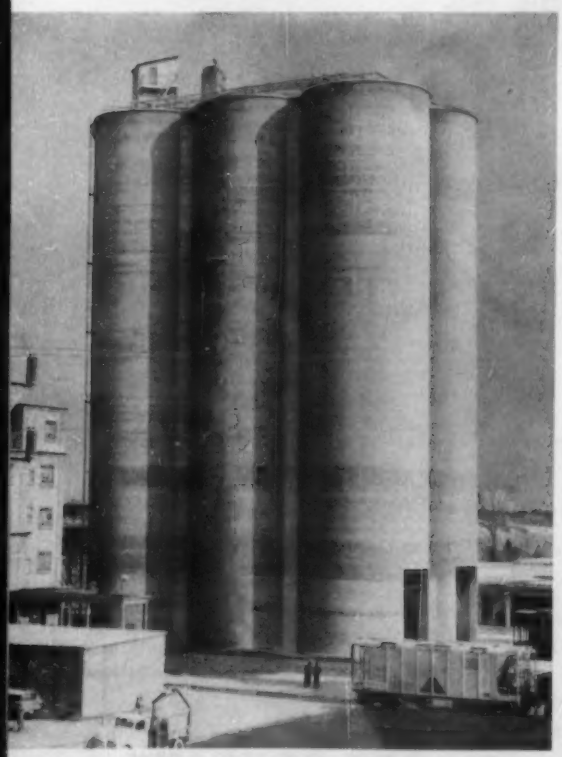

Bulk loading station and storage silos designed and constructed for Dragon Cement Company, Division of American-Marietta Company, at Thomaston, Maine.

Rust has designed and constructed many Productive Landmarks

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C-2

DOLOMITE UNLOCKS MAGNESIA . . .

continued from page 114

A front end loader fills a traveling reclaim hopper over the reclaim belt conveyor removing the full length of the storage area. Then a bucket elevator takes the conveyor discharge and lifts it to a 4 x 10-ft. double-deck vibrating screen. Oversize from the screen drops to a gyratory crusher. Through-screen material either joins the crushed material to be returned to storage, or goes on to one of two 400-ton kiln feed tanks.

Two sizes of rock can be put into the kiln. These can be drawn out of either tank at the discretion of the operator, who observes the changing kiln reactions. A small weighing feeder under a surge tank (at the feed end of the kiln) records the amount of stone fed to the kiln. Capacity of the kiln is well above the 18 tph. needed to process the maximum amount of seawater. Actual lime production must be carefully coordinated with the volume of seawater coming into the reactor tank since there is only a 100-ton lime storage tank ahead of it.

Soft-burned, highly reactive dolime is produced in the 9 x 300-ft. gas-fired rotary kiln at a normal rate of about 8 tph. The lime is cooled and the heat recovered by incoming secondary combustion air in eight cylindrical cooler pods. As each of these steel barrels passes under the discharge point of the kiln, it picks up a small charge of red-hot lime. This passes down the shell, spreading out to expose more surface to the cool, incoming air. By the time the lime has reached the end of the cylinder, it has cooled enough to be handled in a heat-resistant belt conveyor.

Even though the new plant is located on a desolate tract of reclaimed swampland, process dust is carefully collected. Dust from the dolime kiln's exhaust air is collected and trucked to waste disposal areas. However, the fine dusts so carefully collected from the two kilns further on in the system represent premium-grade material that must be retained there.

Limes slaking is the next step. A hammermill reduces quicklime lumps to fines before they are fed to a small slaking tank ahead of the 60-ft. diam. reactor tank. Part of the lime is dropped to a 3 x 15-ft. rake classifier where it joins unreacted oversize particles from the reactor tank sludge. Overflow from this classifier, about 10 to 15 percent of the original, is pumped to a 60-ft. diam. seawater conditioning tank. Meanwhile, oversize particles are delivered to a 4½-ft. diam. ball mill and the fines recycled to the classifier.

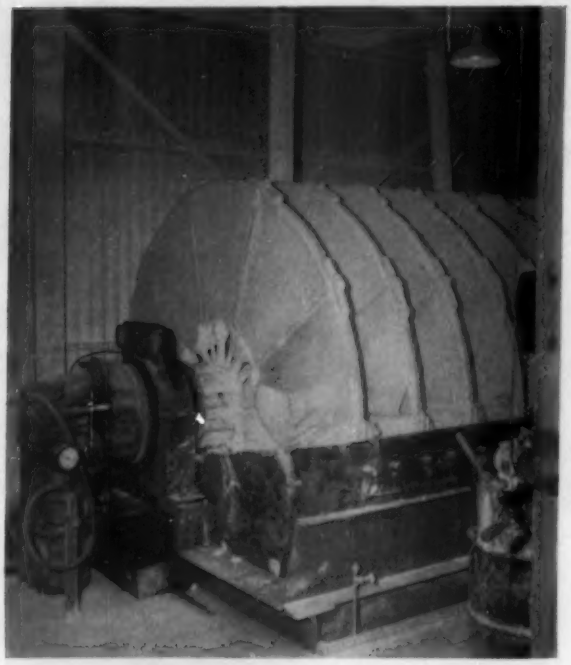
Please turn page

Dolomite is soft-burned to chemically active dolime in a 9 x 300-ft. rotary kiln. Part of the output is used to soften seawater

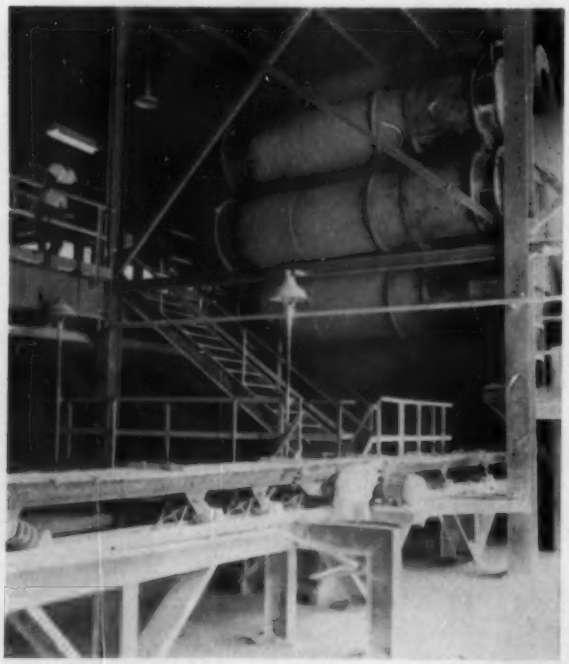
Precipitated magnesia is dried in the kiln at the right, while the kiln at the left hard-burns magnesium oxide to periclase

DOLOMITE UNLOCKS MAGNESIA . . .

continued from page 117



Washed milk of magnesia from the seawater system is dewatered in one of a pair of vacuum filters



Dried magnesia is conveyed from a kiln to a pair of pelletizing presses. Here, the material is compressed before it is introduced into the final kiln

Trace elements are added either at the lime slaker, at the conditioning tank or at the filters later on in the system. They improve the efficiency of the final kiln when normal soft-burned magnesium oxide is converted to the dense, hard-burned form—periclase.

A maximum of 550,000 gph. of seawater comes into the plant through nearly half a mile of 30-in. diam. wooden stave piping. The water intake is protected with a traveling screen against trash. A battery of three big turbine pumps maintains the water supply to the seawater conditioning tank, while a small chlorinator doses it to prevent buildup of algae or other organic growths in the long pipe.

Seawater is "softened" as the small amount of lime added in the conditioning tank precipitates carbonates in a 150-ft. diam. settling tank. These are the basic chemical reactions at this point:

Slaking: $CaO + H_2O \rightarrow Ca(OH)_2$

Softening:

$Ca(OH)_2 + Ca(HCO_3)_2 \rightarrow CaCO_3 \downarrow + 2\ H_2O$

An excess of lime assures that all of the carbonates will be precipitated and that the relative alkalinity of the system will be maintained well above pH 10. The carbonate sludges are withdrawn from the tank with a rotating mechanism and are pumped to a waste disposal area. Overflow water than proceeds to the reactor tank where the dolomitic lime precipitates highly insoluble magnesium hydroxide from the seawater. About half of the final product is contributed by the seawater and half by the dolomitic lime according to these reactions:

Lime slaking: $2CaO + MgO + 4\ H_2O \rightarrow Ca(OH)_2 + 2\ Mg(OH)_2 \downarrow$ (product)

Seawater salt reaction:

$2Ca(OH)_2 + MgCl_2 + MgSO_4 \rightarrow CaCl_2 + CaSO_4 + 2\ Mg(OH) \downarrow$ (product)

Unreacted limes sludges are withdrawn by the tank's mechanism and are pumped to a circular sieve. Oversize is dropped to the rake classifier mentioned above, and the suspension of fines is returned to the slaking tank. The rest of the seawater processing system is merely a matter of drawing off unwanted calcium salt solutions, washing the precipitated solids with fresh water and removing excess water with vacuum filters.

Primary thickening is done in a 300-ft. diam. tank where about 540,000 gph. of spent seawater is drawn off and discharged to a drainage canal. The suspended solids are collected by the tank

Please turn to page 120

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There's no nitroglycerine in HDP Primers, so they are less sensitive to shock and friction than dynamite primers. There's no headache-causing ingredient. And assembly to "Primacord" or caps is easy to make, through holes in each primer. You can even do it with heavy work gloves on.

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Your Du Pont Explosives Department representative or distributor can arrange for you to try out new HDP Primers now. Call him for details. Or for a copy of our new bulletin on the subject, write Du Pont, 2446 Nemours Building, Wilmington 98, Delaware.

EXPLOSIVES DUPONT

Better Things for Better Living . . . Through Chemistry

DOLOMITE UNLOCKS MAGNESIA . . .

continued from page 118

machinery and are pumped to two 150-ft. diam. washing tanks in series. About 30,000 gph. of fresh water is introduced into the first of these tanks to dilute the brines brought with the pulp. By the time the solid hydroxide leaves the second tank, it has been reduced to a slurry with about 20 percent solids.

Filtration is the final step in water processing. Here, the slurry is reduced to about 50 percent solids in a pair of 8½-ft. diam. vacuum filters in parallel. Filter cake is processed at a rate of about 18 tph. and conveyed to the drying kiln in a screw conveyor system. Filtrate is pumped back to the primary thickener so that through-filter suspended fines can be recovered. As an alternative, the operators can divert this filtrate to either one of the two washing tanks.

This first gas-fired kiln is a 11 x 9 x 256-ft. unit that removes both free and combined water from magnesium hydroxide at 2,350 deg. F. as it converts the slurry to a light, extremely reactive form of magnesium oxide. Normal operation of this kiln yields about 6 tph. of material at about 400 deg. F. An oscillating conveyor picks up the hot fines from the cooler pods on the kiln and carries them to a long belt conveyor for the trip to the feed end of the periclase kiln.

To convert the light, fluffy magnesia into a form that can be calcined, it is pelletized in one of two presses. The almond-shaped pellets are then screened before they are dropped into the kiln. Through-screen material is returned to the surge bins above the presses.

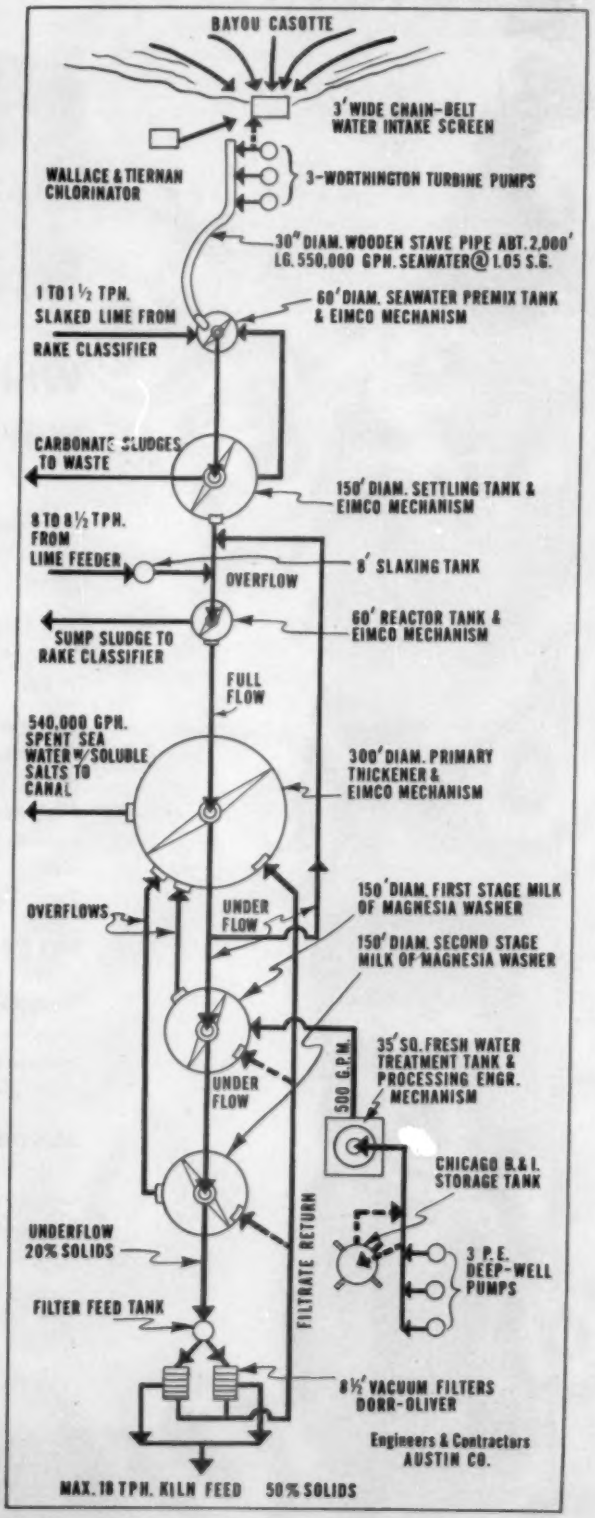
Firing temperature in the 8 x 170-ft. kiln is about 3,250 deg. F., and the periclase is produced at about 5¼ tph. Density of the finished material is held at about 3.20 sg. as it comes from the cooler pods at the end of the kiln and discharges to the conveyor system that will take it to the two 1,000-ton periclase storage bins. This density is carefully and regularly checked, since it directly affects the quality of the refractories. All reduction in crystal volume must take place in this last kiln, rather than after the refractory products have been placed in high-temperature service.

Any kiln discharge that does not meet specifications is collected and returned to the feed end of the kiln. A small skip hoist is available for this purpose and it discharges material directly into the kiln for another pass through the kiln.

Finished periclase is taken from the storage tanks to the refractory plant in a long belt conveyor system. Once there, the fine material is

Please turn to page 122

Seawater surges through seven tanks as solids are precipitated, decanted and washed


BAYOU CASOTTE
3' WIDE CHAIN-BELT WATER INTAKE SCREEN
WALLACE & TIERNAN CHLORINATOR
3-WORTHINGTON TURBINE PUMPS
30" DIAM. WOODEN STAVE PIPE ABT. 2,000' LG. 550,000 GPM. SEAWATER @ 1.05 S.G.
1 TO 1½ TPH. SLAKED LIME FROM RAKE CLASSIFIER
60' DIAM. SEAWATER PREMIX TANK & EIMCO MECHANISM
CARBONATE SLUDGES TO WASTE
150' DIAM. SETTLING TANK & EIMCO MECHANISM
8 TO 8½ TPH. FROM LIME FEEDER
8' SLAKING TANK
OVERFLOW
60' REACTOR TANK & EIMCO MECHANISM
SUMP SLUDGE TO RAKE CLASSIFIER
FULL FLOW
540,000 GPH. SPENT SEA WATER W/SOLUBLE SALTS TO CANAL
300' DIAM. PRIMARY THICKENER & EIMCO MECHANISM
OVERFLOWS
UNDER FLOW
150' DIAM. FIRST STAGE MILK OF MAGNESIA WASHER
150' DIAM. SECOND STAGE MILK OF MAGNESIA WASHER
UNDER FLOW
500 G.P.M.
35' SQ. FRESH WATER TREATMENT TANK & PROCESSING ENGR. MECHANISM
CHICAGO B. & I. STORAGE TANK
FILTRATE RETURN
3 P.E. DEEP-WELL PUMPS
UNDERFLOW 20% SOLIDS
FILTER FEED TANK
8½' VACUUM FILTERS DORR-OLIVER
Engineers & Contractors AUSTIN CO.
MAX. 18 TPH. KILN FEED 50% SOLIDS

GET REAL PRODUCTIVITY—GET A GM DIESEL

"Time is money" in construction as well as in any other business—and that's the big reason why Connecticut's Arute Brothers use GM Diesels in so much of their equipment.

They know from experience that a "Jimmy" will grab hold of a load and go right *now*, whether it's running a compressor, shovel, truck or loader.

They know, too, that GM Diesels keep their full power even after thousands of hours of day-in, day-out operation . . . point to the 6-110 "Jimmy" powering an I-R 900 compressor that's run 60 hours a week for months "with not so much as a tune-up on the valves or injectors," according to Supt. Jim MalCarney.

Mr. MalCarney says he likes the "Jimmys" in off-highway haulers because "their fast acceleration gives us better time on contracts, particularly when we're hauling on the unleveled dirt roads within building projects."

And Arute Brothers can also save money on parts stocks by specifying GM Diesels in their equipment. For instance, 6-110 GM Diesels power the I-R 900 and two 71-B shovels . . . so the same basic parts fit the engine in all three units. And with Series 71 GM Diesels in their other equipment, they can use a single stock of interchangeable parts to back up more than 10 other units.

Want the full story? Call your GM Diesel distributor. He's part of a coast-to-coast network of "engine people" you'll find in the Yellow Pages under "Engines, Diesel"—or write direct for details.

GM DIESEL

DETROIT DIESEL ENGINE DIVISION,
GENERAL MOTORS, DETROIT 28, MICH.

In Canada, GENERAL MOTORS DIESEL LIMITED, London, Ontario
Parts and Service Worldwide

GM DIESEL ALL-PURPOSE POWER LINE sets the standard of Diesel productivity

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DOLOMITE UNLOCKS MAGNESIA . . .

continued from page 120

carefully and accurately screened to one of the many sizes used to make a refractory brick. This new plant is fully equipped with automatic weighing and batching machinery to produce chemically bonded refractories of maximum density.

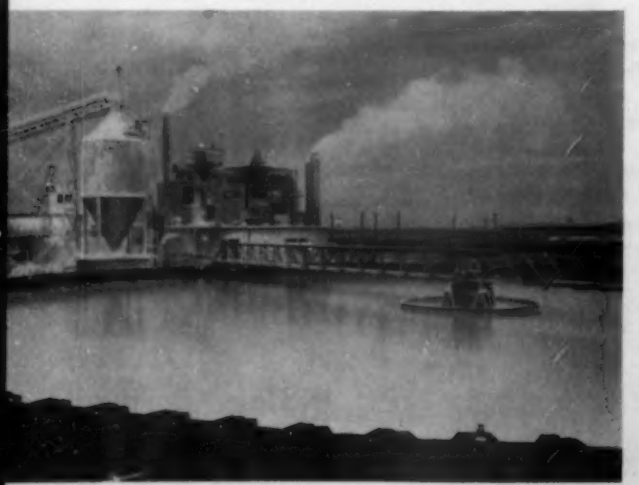
As refractories are consumed under operation, replacement rather than new construction is the major factor behind the current demand for these products. The need is anticipated to continue, as not only the steel, but the chemical, cement, glass and power industries grow and expand. **END**

A wooden-stave pipe line snakes its way across the filled swampland to bring seawater from Bayou Casotte to the water-softening tank

MAJOR EQUIPMENT REFERENCE

DOLOMITE PROCESSING SYSTEM	
Belt conveyors	Continental Gin Co.
Bucket elevators	Continental Gin Co.
Conveyor belts	Quaker Rubber Div., H. K. Porter Co.
Vibrating screen, 4 x 10-ft. dd.	W. S. Tyler Co.
Gyratory crusher, No. 38	Kennedy Van Saun Engr. & Mfg. Co.
Dolomite kiln, 9 x 300-ft.	F. L. Smidth Co.
Magnesia kiln, 11 x 9 x 256-ft.	F. L. Smidth Co.
Periclase kiln, 8 x 170-ft.	F. L. Smidth Co.
Screw conveyors	Link-Belt Co.
Oscillating conveyors	Link-Belt Co.
Weighing feeders, (2)	Shaffer Poidometer Co.
Belt scale	Merrick Scale Mfg. Co.
Electromagnet	Dings Magnetic Separator Co.
Skip hoist	Campbell Equipment Co.
Hammermill, 24 x 18-in.	Jeffrey Mfg. Co.
Vibrating screen, 3 x 6-ft.	Allis-Chalmers Mfg. Co.
Switchgear	Allis-Chalmers Mfg. Co.
Motors	Allis-Chalmers Mfg. Co.
Steel storage tanks	Chicago Bridge & Iron Co.
Design & construction	Austin Co.
SEAWATER PROCESSING SYSTEM	
Traveling water intake screen, 36-in.	Chain Belt Co.
Pumps, vertical turbine, (3)	Worthington Corp.
Chlorinator system	Wallace & Tiernan Co.
Mixing tank machinery, (5)	Eimco Corp.
Rake classifier, 3 x 15-ft.	Dorr-Oliver Corp.
Vacuum filters, 8¼-ft. diam., (2)	Dorr-Oliver Corp.
Reject screen	Southwestern Engr. Co.
Ball mill, 4½-ft. diam.	Hardinge Co.
Pumps	Process Engr. Co.
Fresh water processing equipment	Process Engr. Co.
Overhead storage tank	Chicago Bridge & Iron Co.
Cathodic protection for steel tanks	Corrosion Rectifying Co.
Design & Construction	Austin Co.

Precipitated carbonate sludges are collected in a settling tank. The overflow from this tank is mixed with slaked dolime as it goes to a reactor tank



A 300-ft. diam. primary thickener sends precipitated milk of magnesia to two 150-ft. diam. washing tanks in series

Five shots in a 1¼" circle at 50 feet. Faster. And quieter.

(Fired by the Ringblaster® Kiln Gun)

Highest accuracy plus the extraordinary smashing power of Western Super-X Industrial Ammunition are the reasons why Ringblaster helps to keep more rotary kilns productive than any other kiln gun in use today.

The Ringblaster is a rock-solid firing platform to which both bead and bore sights have been added, making it a precision instrument for demolishing kiln clinker rings with the fewest possible shots. It's fast too. A short stroke action and streamlined loading procedure give it a rate of fire that approaches "automatic." (Also quieter. It's the first kiln gun factory-equipped with a sound reducer.)

Note to plant managers: the power you buy is the power that's delivered to the clinker rings. Western's patented cup-wad seals the explosion gases behind the lead slug. There's almost no blow-by. Another exclusive Western development is the impregnated capsule that surrounds the slug. It virtually eliminates lead buildup in the barrel and the sound reducer. Hundreds of thousands of test rounds have proven that barrel life is increased up to 200%.

The Ringblaster has accuracy, power, speed of operation: that's what keeps kilns economically productive. Write us for details on the Ringblaster and the availability of shells designed for your specific needs. ***Ramset*® *Fastening System***

WINCHESTER-WESTERN DIVISION **Olin** WINCHESTER AVE., NEW HAVEN 4, CONN.

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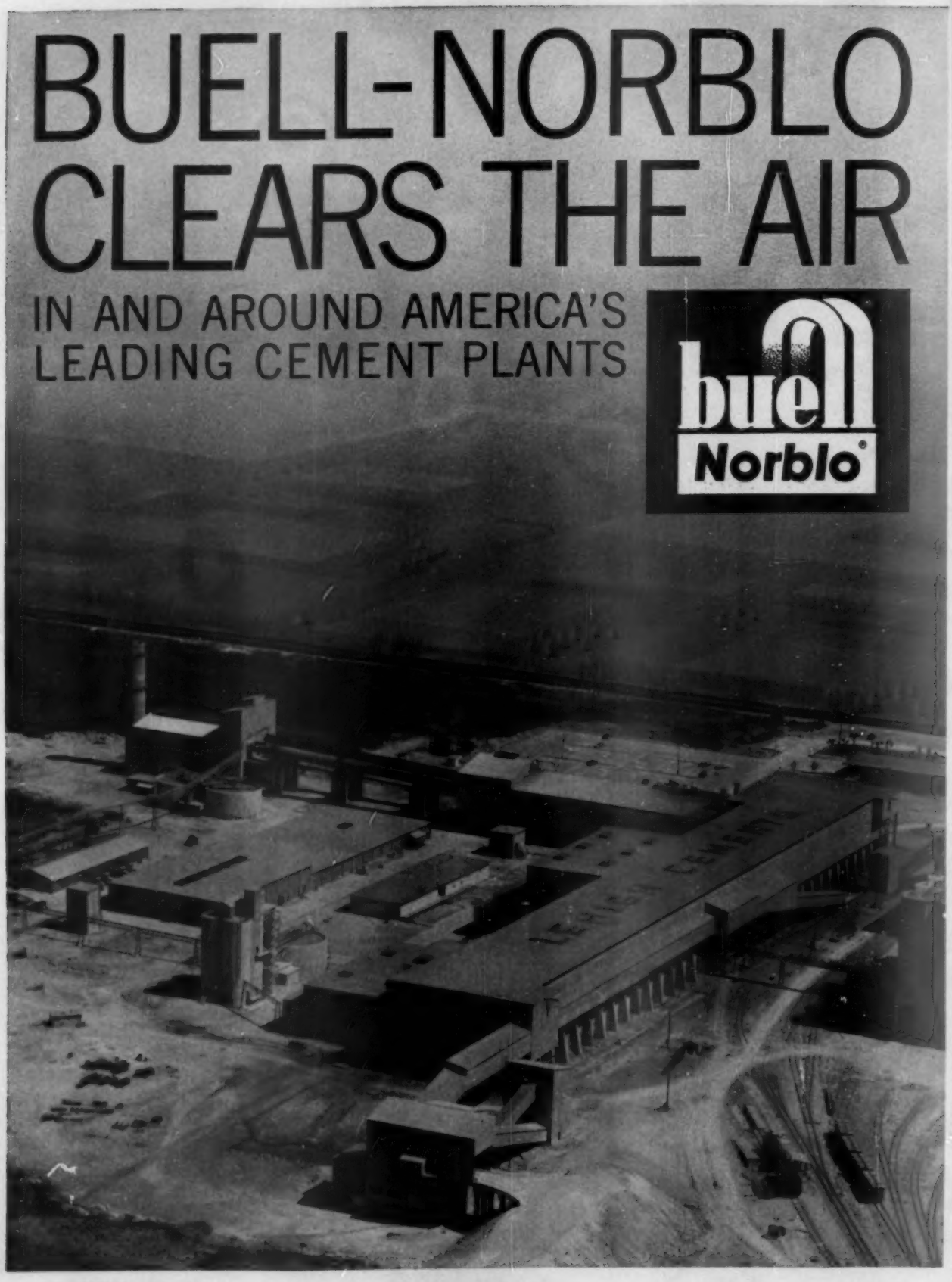
BUELL-NORBLO CLEARS THE AIR

IN AND AROUND AMERICA'S LEADING CEMENT PLANTS

buell Norblo®



For dust control and the elimination of air pollution, Buell-Norblo equipment is "first choice" in the cement industry. And for good reasons, too. No one can match our years of experience in this field, with continued high operating efficiency and low maintenance recorded by Buell-Norblo equipment in hundreds of installations. We'll be glad to work with you on improving your existing dust control systems as well as new plant construction. Field service engineers are qualified to help you design, lay out and select the proper type of equipment for each application. There's no obligation. Why not contact us for a complete study on how best to clear the air in and around your plant? Buell Engineering Company, Inc., 123 William Street, New York 38, New York. Northern Blower Division, 6409 Barberton Avenue, Cleveland, Ohio. (Subsidiary: Ambuco Limited, London, England).
■ Cyclones ■ Electric Precipitators ■ Bag Collectors ■ Combination Systems ■ Fans ■ Classifiers

Buell Electric Precipitators provide the highest efficiency in cleaning gas from cement kilns and thereby preventing air pollution.

Norblo Bag Type Dust Arresters on grinding mills, clinker handling, pack-house and crushing operations keep plant areas clean.
Norblo air cooling systems in the milling process provide cooler, more efficient grinding and lowered temperature of fines ready for storage.

Buell Classifying Systems perform separating operations in size classification of all types of materials. They have the capacity to keep up with any milling operations.

Buell Cyclones alone or in combination with Buell precipitators can recover valuable materials as well as provide high efficiency dust control.

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Tariff Commission's recent decision gives ray of hope for relief to hard-pressed eastern cement plants

Import battles pay off

THE PAINFULLY HIGH IMPORT LEVEL continued to plague domestic producers of portland cement through the first five months of 1960. But thereafter fewer and fewer barrels poured into the country, until the total imports for the year declined 24 percent from 1959's record 4,975,000 bbl.

In the period from January to May, 1,407,000 bbl. of portland cement (except white) were imported, compared with 1,320,000 bbl. in the first 5 months of 1959. However, in all but one of the remaining months of 1960, imports were lower—and usually much lower—than in the comparable months of 1959. Only in August, when 515,000 bbl. were imported, did supplies of foreign cement approach the volume of the previous year's and early fall months.

Bureau of Census statistics show that 20 countries shipped cement to the United States in 1960; only 15 did so in 1959. The largest suppliers were Canada, Colombia, Belgium, Israel and Norway, in that order. West Germany, fourth largest in 1959, supplied only a minor amount in 1960, reportedly because importers of German cement were notified by the Treasury Department that there had been a complaint of suspected "sales at less than fair (home market) value" filed.

Poland was about the only country to export

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U. S. Imports of Portland Cement (except White), By Year (U. S. Bbl.)

1955	4,560,000
1956	3,600,000
1957	3,847,000
1958	3,111,000
1959	4,975,000
1960	3,766,000

U. S. Imports of White Cement, By Year (U. S. Bbl.)

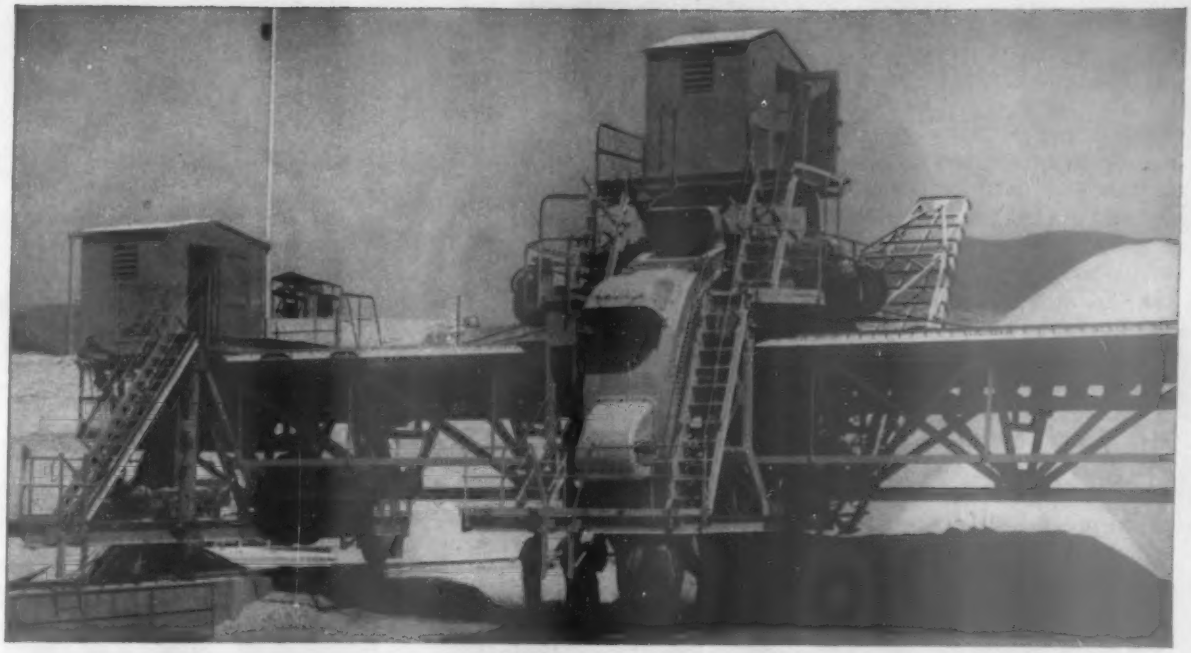
1955	193,000
1956	300,000
1957	448,000
1958	258,000
1959	280,000
1960	281,000

U. S. Imports of Portland Cement (except White), By Country of Origin (U. S. Bbl.)

Country	1958	1959	1960
Canada	657,100	1,491,200	868,700
Colombia	473,900	791,400	537,000
Belgium	410,800	581,400	326,200
West Germany	325,100	578,600	51,400
Sweden	304,700	280,700	289,600
Norway	270,800	454,400	310,200
United Kingdom	209,700	143,000	23,100
Denmark	192,800	129,800	92,800
Poland	68,500	42,600	243,700
Israel	58,200	349,000	319,200
Yugoslavia	47,500	67,400	58,800
Egypt	32,600	53,000	-
Switzerland	19,500	-	-
Japan	18,000	100	37,300
Mexico	10,800	10,200	5,900
Dominican Republic	7,500	-	111,100
France	3,100	-	30,200
Bahamas	-	2,500	-
Portugal	-	-	290,800
Tunisia	-	-	85,400
Italy	-	-	58,400
Canary Islands	-	-	20,000
Union of South Africa	-	-	6,300
Totals	3,110,600	4,975,300	3,766,100

U. S. Imports of White Cement, By Country of Origin, 1958-60 (U. S. Bbl.)

Country	1958	1959	1960
Belgium	77,900	109,300	99,400
Denmark	46,300	17,700	6,400
United Kingdom	37,800	31,500	11,100
France	37,400	43,200	68,900
West Germany	25,800	22,500	14,900
Colombia	25,100	25,700	17,200
Japan	4,700	23,800	47,800
Mexico	3,300	6,600	14,900
Canada	-	100	-
Totals	258,300	280,400	280,600



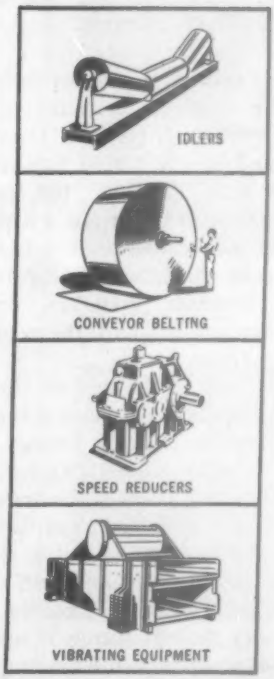
BIG WHEEL

It blends... it reclaims... it ends inefficiencies of selective mining

As part of a new H-R Rotary Bucket Wheel Blending and Reclaiming System, this giant 3-story wheel is capable of processing efficiently a broad range of materials . . . especially where more than one of the following typical situations exist:

1. Engaged in selective mining
2. Unable to comply with specifications
3. Too much coarse or fine material in feed
4. Storage pile requirements range 50,000 tons and over
5. Two or more types of raw material to blend for chemical compounding.

For full details consult your H-R representative, or write Hewitt-Robins, Stamford, Connecticut. Ask for Bulletin 5-19.



HR HEWITT-ROBINS

THE NAME THAT MEANS EVERYTHING IN BULK MATERIALS HANDLING SYSTEMS...

CONVEYOR BELTING AND IDLERS • INDUSTRIAL HOSE • VIBRATING FEEDERS, SCREENS & SHAKEOUTS • POWER TRANSMISSION EQUIPMENT

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CEMENT IMPORTS . . .

continued from page 126

more cement in 1960 than in 1959—244,000 bbl. as compared with 43,000 bbl. The reason? Near the end of 1960 the President of the United States removed Poland from the list of Communist-dominated nations, thereby extending to imports from that country the benefits of reduced tariff rates negotiated at the several GATT (General Agreement on Tariffs & Trade) meetings. The importer of German cement then switched to Polish cement, when the aforementioned "dumping" charges were filed against the German producers.

A duty of only 2¼¢ per 100 lb. (8.5¢ per bbl.) will now be paid on imported Polish cement instead of the previous 6¢ per 100 lb. (22.7¢ per bbl.). This will, no doubt, lead to a further increase in imports. Neither standard portland nor white cement is on the list for possible further reduction in duty at the 1961 meeting of GATT.

When Florida longshoremen refused to unload Polish cement, back in 1958, a minor international incident ensued. Imports into Florida had been declining for several years, so that the state lost its long-time distinction of being the principal Customs district of entry of imported cement. In 1960, Providence, Rhode Island, was the major port of entry for Polish cement, and in over-all entries, Connecticut led with 853,000 bbl., followed by Florida with 605,000 bbl. and Rochester, New York, with 575,000 barrels.

U. S. Imports of Portland Cement (except White), By Month, 1957-60
(U. S. Bbl.)

Month	1957	1958	1959	1960
January	146,000	190,000	189,900	191,100
February	146,800	171,700	210,400	252,900
March	154,700	181,400	237,500	292,500
April	199,500	117,800	316,500	294,600
May	161,300	272,100	365,800	375,800
June	159,500	178,000	613,800	382,800
July	733,800	510,900	691,300	342,900
August	1,064,300	319,500	448,000	514,600
September	515,500	306,300	651,200	235,500
October	378,000	377,600	487,900	294,200
November	69,200	220,200	399,400	365,400
December	118,500	265,100	363,600	223,800
Totals	3,847,100	3,110,600	4,975,300	3,766,100

U. S. Imports of White Cement, By Month, 1957-60
(U. S. Bbl.)

Month	1957	1958	1959	1960
January	34,600	39,700	16,800	30,200
February	33,200	13,400	27,100	29,700
March	27,100	8,500	20,900	35,600
April	17,600	10,000	11,700	23,600
May	23,600	32,600	25,100	25,700
June	33,800	13,400	28,100	33,300
July	30,600	28,600	28,900	14,400
August	64,700	23,900	17,200	15,200
September	41,200	21,700	25,300	15,000
October	66,100	25,000	20,800	17,300
November	27,900	26,900	28,100	19,600
December	47,800	14,600	30,400	21,000
Totals	448,200	258,300	280,400	280,600

Imported cement continued to be an acute problem to the domestic industry in southern New England, with imports into Connecticut, Massachusetts and Rhode Island totaling 1,481,000 bbl. compared with 1,546,000 bbl. in 1959. Cement prices in those states were widely depressed, although price levels were both higher and less erratic than in the later part of 1959. A group of domestic cement producers pressed dumping charges against most of the countries supplying cement to those States.

Finally, just at the end of the year, Treasury issued against one of those countries—Sweden—a determination that its cement "is being, or is likely to be, sold at less than fair value," and the case went to the Tariff Commission for a determination as to whether sales of Swedish cement are injuring the domestic industry.

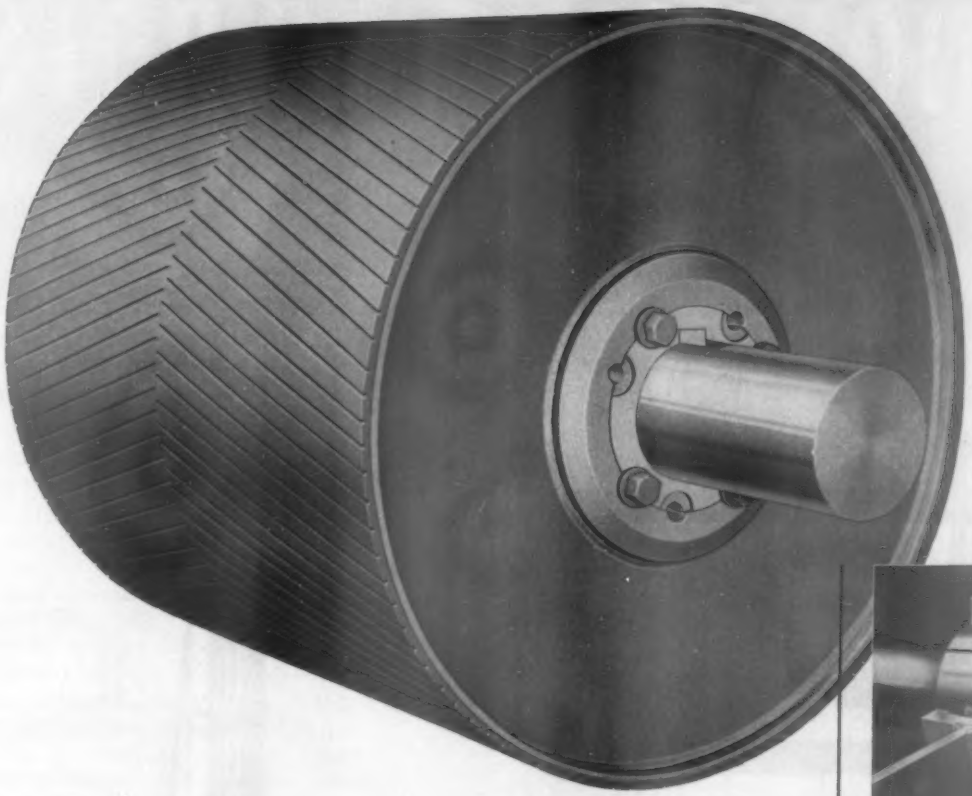
On January 4, 1961, the Tariff Commission instituted the investigation; a public hearing was held on February 28 and March 1; and on April 4, the Commission announced a finding of injury to the domestic industry supplying Rhode Island, eastern Massachusetts and eastern Connecticut. Furthermore, the Commission explicitly recognized the principal that there is more than one cement industry in the United States when it stated: "The domestic portland cement plants that have historically supplied . . . (Rhode Island, eastern Massachusetts and eastern Connecticut) . . . and that have, in recent years, sold substantial quantities of such cement there, are considered to constitute 'an industry' for the purposes of the Anti-dumping Act."

It is anticipated that this decision will serve as a damper on imports of extremely low-priced cement. It is, however, no deterrent to sales to importers at substantially the same price at which the exporter sells in his home market.

Prior to Treasury's determination against Sweden, it dropped similar charges against Norway. Domestic cement producers took the case to District Court, contending that Treasury acted illegally and asking the Court to order that agency not to drop the charges; in November, the Court ruled 3-0 that it had no jurisdiction in the matter.

Puerto Rico imported 335,000 bbl. of portland cement from Colombia and Dominican Republic,

Please turn to page 186



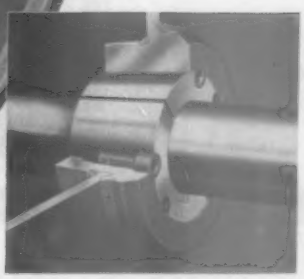
AMERICA'S NO. 1 STEEL CONVEYOR PULLEY!

There are more Taper-Lock Steel Conveyor Pulleys than any other operating on big jobs. Why? Simply because of the dependable performance they deliver under the toughest conditions.

The rims, discs and hubs are *steel* — and they are fused together into jointless drum construction for (1) maximum strength with minimum weight, (2) exclusion of dirt, water and steam, (3) terrific shock resistance. Every weld is made by the submerged arc process giving deep penetration and exceptional strength. Rims are accurately die formed in the smaller diameters and rolled in the larger diameters. Pulleys with 26" and wider faces have interior discs that add to the trueness, rigidity and strength of the rims.

Dodge offers the world's biggest range of stock sizes. Diameters from 6 inches to 8 feet — all face widths, crowned or flat. Standard or special rubber lagging available. Ask your local Dodge Distributor — or write us for a technical bulletin.

Dodge Manufacturing Corporation, 2600 Union Street, Mishawaka, Indiana



No "walking" on the shaft with Taper-Lock. Full length contact of hub. Holds under heavy loads and shock. Easy on — easy off.

Patented Back-up Bars give full rim strength through 100% weld penetration. Diametrically opposed bars insure balance.

Jointless construction creates a drum fully sealed against conveyed materials of all kinds as well as dirt, water and steam.

The Products with the Pluses... **DODGE** *of Mishawaka, Ind.*

CALL THE TRANSMISSIONEER, your local Dodge Distributor. Look under "Dodge Transmissioneer" in the white pages of your phone book. Factory trained by Dodge, he can give you valuable assistance on new cost-saving methods.

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ANNOUNCING LE ROI'S

A new line of powerful . . . highly portable . .

These rigs come on tires or tracks!

THE LRD-2

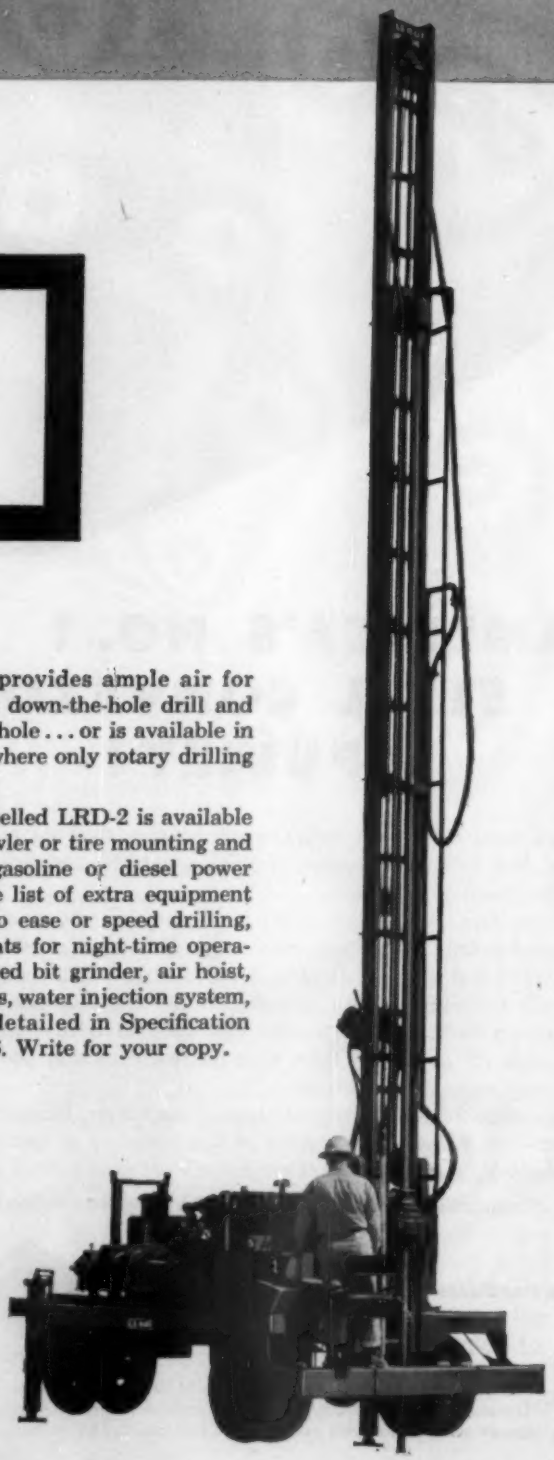
Here's a highly portable blasthole drill for making hole up to 4½ inches as deep as 30 feet . . . equipped for either positive-drive rotary drilling or powerful down-the-hole percussive drilling.

What's more, the LRD-2 is completely self-contained . . . and economically priced, too!

The entire unit is easily handled by one man. Controls are conveniently grouped at an operator's station located alongside the drilling area. The unit can be moved, leveling jacks hydraulically set, boom hydraulically raised, drill pipe and bits connected, and hole started — all with a few non-fatiguing motions.

Powerful direct mechanical drive keeps the rotary table turning — won't bog down or lose torque under rough going like air or hydraulic driven units — eats through tough rock formations under 10,000 lbs. pulldown pressure at speeds from 40 to 250 rpm. If necessary, a hard-hitting down-the-hole drill can quickly be substituted for the rotary bit to drill extremely hard rock formations. A Le Roi 25 hp two-stage air compressor provides ample air for powering the down-the-hole drill and cleaning out hole . . . or is available in single-stage where only rotary drilling is necessary.

The self-propelled LRD-2 is available either on crawler or tire mounting and with either gasoline or diesel power unit. A whole list of extra equipment is available to ease or speed drilling, including lights for night-time operation, a mounted bit grinder, air hoist, breakout tongs, water injection system, etc. . . . all detailed in Specification Sheet AT-146. Write for your copy.



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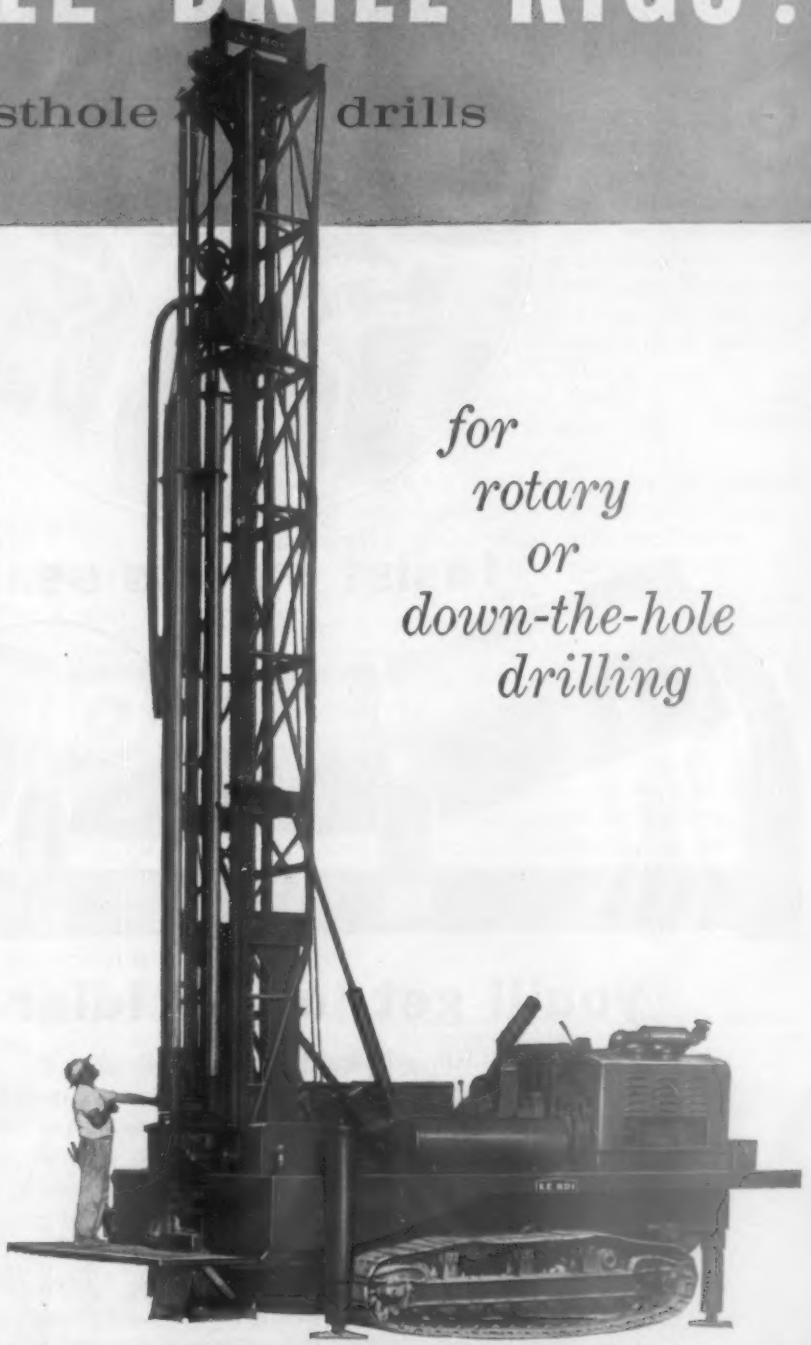
rotary blasthole drills



for rotary or down-the-hole drilling

THE LRD-3

Here's the *big* rig . . . completely self-contained for putting down hole as large as 7⅞ in. to 100 ft. depth!

The LRD-3 is available with either crawler or truck mounting. An enclosed cab can be furnished to provide all-weather protection for the operator while drilling. All controls are conveniently grouped for easy operation and good visibility.

The traveling head design of the LRD-3 provides positive mechanical power without excessive torque loss under heavy pulldown, and permits easy control in making up and breaking down drill-rod. Every function of the unit is designed to speed productive drilling and keep the operator making hole. Leveling, raising the mast, and even the automatic drill pipe magazine are hydraulically controlled for speedy operation. A powerful dust collector traps cuttings and blows them well away from the unit.

An extra-sturdy 4-speed chain-hydraulic pulldown puts up to 30,000 lbs. of pressure on the bit of the LRD-3. A rugged dual-range transmission provides rotary speeds from 9 to 168 rpm in a selection of 10 forward and 2 reverse speeds.

Where needed, the rotary bit can be quickly changed for a powerful down-the-hole drill. A Le Roi 100 hp dual-manifold air compressor provides plenty of 100 psi air for punching through tough rock with the down-the-hole drill, or it can be set to deliver 625 cfm of 40 psi air for fast, efficient removal of cuttings in rotary operation.

The LRD-3 comes complete with a hydraulically operated magazine with capacity for four 20 ft. drill pipes, and can be equipped with optional convenience equipment similar to the LRD-2. Specification Sheet AT-147 describes the unit in detail, with complete spec information. Send for a copy.

LE ROI

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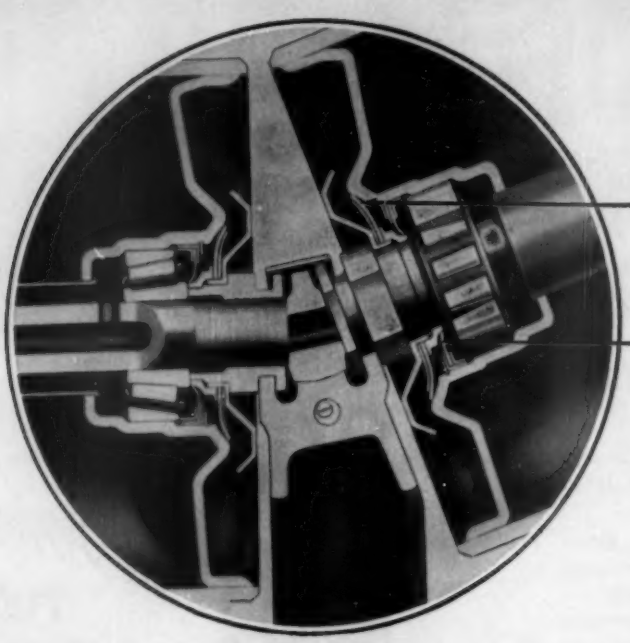
Sidney, Ohio



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This extra assurance of satisfying performance through proper seal design is only one of the many reasons you get more dependability over a longer life from Jeffrey Permaseal Idlers. More extras are described in Bulletin 925A. Write for it today, or contact your nearest Jeffrey authorized distributor. The Jeffrey Manufacturing Company, 935 North Fourth Street, Columbus 16, Ohio.

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Mechanization pays... even in South Africa

... for Coedmore Quarries who use it to make two types of rock, and to control dust at the same time

by J. Erlich*

EVEN IN SOUTH AFRICA, a land where machinery is expensive and labor comparatively cheap, mechanization is a paying proposition.

New plant facilities, near the City of Durban in Natal, have been constructed by Coedmore Quarries. Coedmore daily produces 3,000 tons of finished material in a full range of sizes from 3-in. down to crusher fines. The entire operation, including crushing, screening, quarrying and delivery is run by some 100 men. During the complete manufacturing process, from the quarryface to the customer's building site, the stone is never touched by hand.

Dust-proofing, too, has been implemented at this modern Dark Continent excavation. Spraying with water, it was learned, merely covered the aggregate with an adhesive coating of particles, impossible to remove by subsequent washing. Although experts on concrete work did not view this as objectionable, tar does not readily adhere to such dust-covered stone, limiting its use.

A more efficient system was devised. Four large exhaust fans draw dust from all vital points in the plant. The powdery air is then conducted through coke filters, and the filter accumulation washed down by water sprays, to be discharged as sludge.

*Works Manager, Coedmore Quarries, Durban, South Africa

A special feature of Coedmore Quarries is that the deposit consists of a stratum of whinstone, 30 to 50 ft. deep, sandwiched between two layers of hard quartzite. While both types of rock are suitable for concrete work and road construction, local customer feeling makes it necessary to sell the stone separately. Other complications follow, in that each type must be individually blasted, and fragments on the quarry floor kept unmixed.

Bulldozers remove the overburden, nowhere more than 5 to 6 ft. thick. This is stockpiled and later carried off by 15-ton Euclid lorries, loaded by shovel. The material is either sold as filling or dumped outside the quarry.

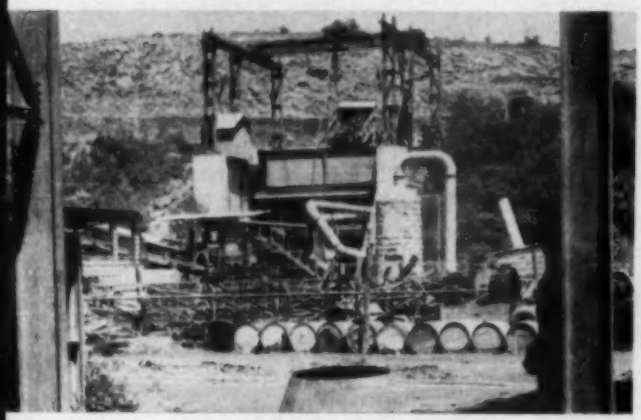
Carried out on two levels, quarrying consists of a top section producing handstone and supplying the old crushing plant, with the bottom level supplying the new plant. Drilling equipment consists of two down-the-hole drills, working 4-in. and 3-in. holes up to a depth of 60 ft., and 5 wagon-drills. Several jackhammers are used for secondary blasting—sparingly, however, as the size of loading and crushing equipment permits crushing of boulders up to 30 in. Most of the necessary fragmentation is achieved by two dropball cranes. Three 1½-cu. yd. mechanical shovels load blasted stone into 15-ton Euclid lorries. Compressed air is supplied by three portable and three stationary compressors. Recently, however, a bulldozer with

Please turn page

Basaltic whinstone is sandwiched between quartzite ledges. The two types of stone are carefully segregated in the quarry

continued from page 133

The quarry must be worked in benches to maintain the separation between the two types of rock



Dust from hoppers, screens and crushers is collected in coke-packed concrete block towers. When the coke is backwashed, the dust is discharged as a sludge

Finished aggregates are screened in these towers and are loaded out with short reclaim conveyors

a ripper was purchased and ripping or pre-blasting and ripping techniques are taking over.

At the new plant, designed and erected by a Scottish firm, with American machinery doing the work, 450 tons of rock can be crushed every hour down to 6-in. size. A primary crusher—a 30-inch gyratory—is employed. The wobbler feeder, equipped with a 50-ton hopper, separates minus 3-in. material, which is then screened on a minus ½-in. scalper, the fines taken out and the coarse sizes returned to the main outlet conveyor. Only plus 3-in. goes through the primary crusher. An intermediate stockpile between the primary and secondary crushers serves to even the flow through the plant and supplies a reserve of primary crushed stone, in the event of breakdown or any other stoppage of the primary crusher.

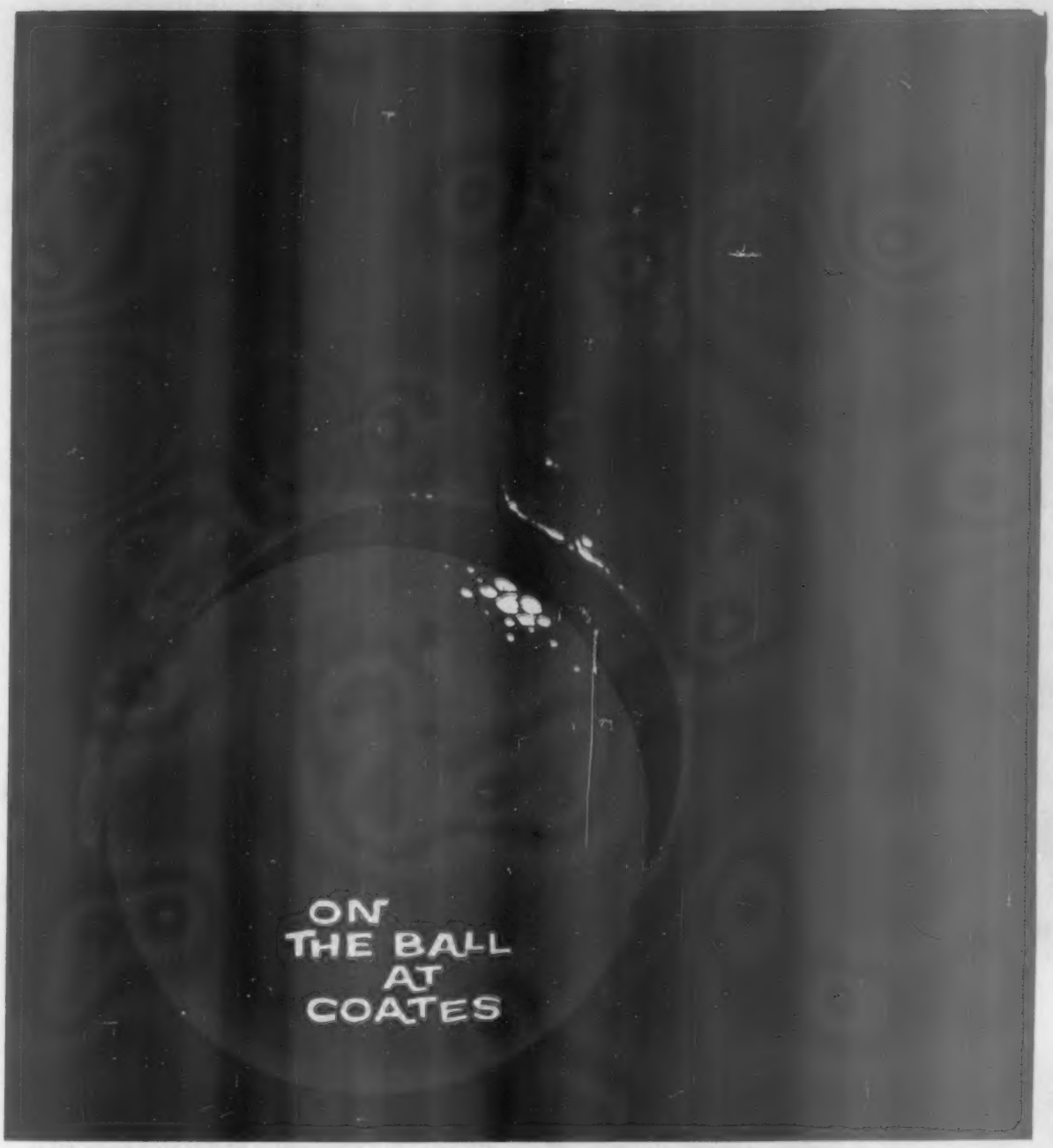
The intermediate stockpile permits a storage of some 25,000 tons of primary crushed stone. This stockpile is divided into two parts by a 27-ft. concrete wall, segregating the whinstone and quartzite. Discharged from the overhead 42-in. conveyor into the two sections is effected by 4 stationary hoppers, operated individually or in pairs, a far cry from the early days of operation, when whinstone and quartzite were separated by hand. A concrete underground recovery tunnel runs below the entire length of the stockpile.

Although concrete in the tunnel has been waterproofed by a bituminous compound, three automatic centrifugal pumps were installed to take care of seepage during the periodic torrential rains of Natal. The tunnel roof contains 6 plate gates, placed so that stone may be drawn from different points of the stockpile. Six reciprocating feeders inside the tunnel provide stone for a 30-in. conveyor, which in turn supplies a 4 x 12-ft. double-deck scalping screen.

The top deck of this screen extracts the 2½-in. material. This bypasses the secondary crusher and goes directly into the screening plant. The minus 2½-in. stone is fed into a gyratory secondary crusher. All minus ⅜-in. material—dust, sand and other impurities—are removed by the bottom deck of the scalping screen. A 24-in. conveyor carries these scalpings to a steel bin, and from this point they are removed from time to time by lorry.

From the secondary crusher, and also from the bypass following the scalping screen, stone is transferred by a 30-in. conveyor to the screening plant, consisting of 5 screening towers and one final discharge tower for crusher-dust. Under-

Please turn to page 136



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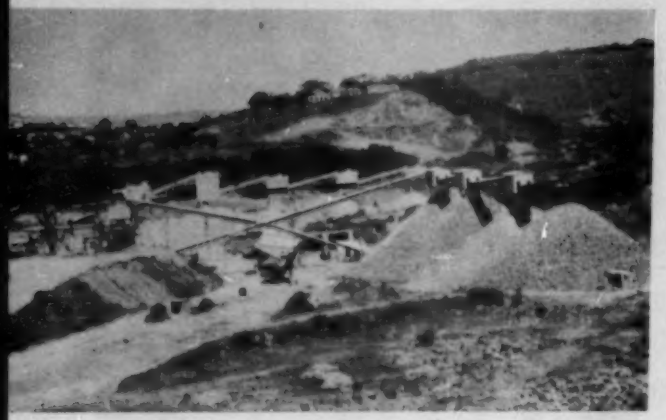
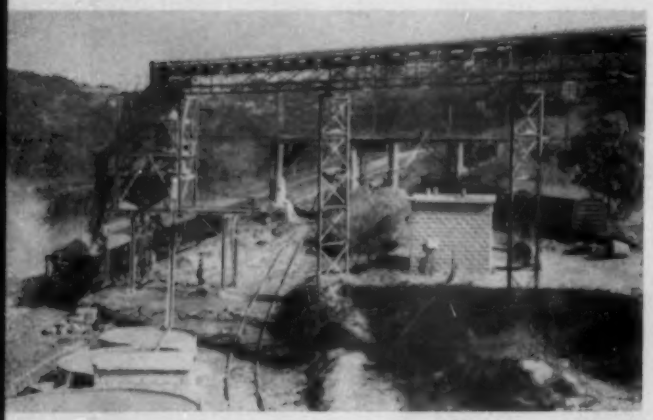
MECHANIZATION PAYS . . .

continued from page 134



An over-all view of the plant shows intermediate stockpiles at the right



About a third of the plant's production is shipped by rail to all parts of Natal

Specialized training of the four racial groups working the quarry (Bantus, Indians, Coloreds and Whites) has stepped up productivity of all

neath is an open storage area divided by concrete walls into 15 compartments, holding different sizes of whinstone and quartzite. Each compartment has a capacity of about 2,500 cu. yd.

Along the length of the storage bays runs another concrete tunnel. Short conveyors are used for loading of lorries, and a long conveyor moving lengthwise in the passageway feeds an 24 x 800-ft. belt to the railway siding. Filling of a 40-ton bogey requires 8 to 15 min., according to the size of the material.

As the recovery tunnel is above ground, it is necessary to bulldoze the finished products to the chutes and also to spread the stone over the length of the bays.

The first screening tower contains a 6 x 12-ft. double-deck screen, the top of which extracts all oversize material. This is either sold as 6 x 3-in. stone or returned for recrushing by the tertiary crushers. The bottom deck produces 2-in. stone and the smaller sizes proceed to the second tower, containing two single-deck 4 x 12-ft. screens working in parallel.

The 1½-in. stone is removed and the smaller again goes to the third tower, equipped with a double-deck 4 x 12-ft. screen, placed at this point, because screening on a single-deck with small opening wire screens was found to be inefficient. Here, ⅞-in. material is produced. Single-deck, 4 x 12-ft. screens in the remaining two towers extract ½-in. and ¼-in. stone respectively.

The final tower acts as a discharge chute for crusher dust. Arranging chutes inside the tunnel permits mixing of different sizes of stone on the conveyor, thus obtaining graded aggregates in all required proportions within 5 percent accuracy. Other facilities fabricate base course crusher run.

Two stone washing plants have also been installed. They are capable of washing some 80 tons of crushed stone an hour and supply the material to tar mixing plants for hard-surfacing of roads.

Plant layout provides for recrushing of all plus ¼-in. rock if required. A conveyor in the recovery tunnel leads to another, which feeds two tertiary crushers. The gyratory machines operate in parallel or separately. Installation of a further tertiary crusher is contemplated to meet the growing demand for smaller sized stone. Discharging into the same conveyor are the tertiary and secondary crushers. Recrushed material can therefore be returned to the screening plant. A new 36 x 24-in.

Please turn to page 189

E-M-pioneered Incher provides quick, safe spotting of mills. It turns mills literally inch-by-inch to desired position merely by pushing a button. One E-M Incher Control can be used to spot several mills.

At Carbon Limestone Company...

"E-M INCHER SAVES US $1,600 A YEAR"

... cuts starter maintenance by over 90%

● At Carbon Limestone Co., Hillsville, Pa., a limestone pulverizing mill must be stopped and spotted every four hours for lubrication. Spotting formerly took about 15 minutes and was done by "jogging" (flicking the starting switch to give the mill a momentary jolt of power). This slow, "hit-and-miss" method resulted in frequent production halts for repairs to the overworked starting system.

To remedy this situation Carbon Limestone installed an E-M Incher. Result: Push-button spotting requiring only *one minute*. In the words of General Superintendent U. F. Masson:

The E-M Incher ... *"Increased productive hours of pulverizing mill 30 minutes in each 8 hours or 6¼%. Reduction of maintenance of starting equipment 90%."*

The E-M Incher can save you big money, too, if you are now using one of the old, time-consuming methods of spotting synchronous motor driven mills.

Write the factory now for complete information about the Incher, and call your nearest E-M Field Engineer.

This mill at Carbon Limestone Co. is quickly positioned by the E-M Incher Control shown in the large illustration.

E-M 3100-TPA-2101

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How AMSCO helps you HANDLE

Interior view of Amsco double wave liners in 7' x 8' ball mill, using 2" balls.

Amsco liner on left lasted 123% longer and ground 134% more tonnage than competitive liner on right.

Bucyrus 88 D four-yard bucket, equipped with Amsco Simplex 2-part Teeth, removing rock for power station. All of Tuscarora Constructors' shovels used for rock excavation are equipped with Amsco Simplex Teeth.

MORE TONS PER DOLLAR

Read how AMSCO Mill Liners and Dipper Teeth are outlasting competitive parts in severe service

AT A LARGE NEW YORK ZINC MINE...

THEY'VE DOUBLED SERVICE LIFE WITH AMSCO CHROME-MOLY BALL MILL LINERS

Amsco double wave chrome-moly liners are used on an Allis-Chalmers 7′ x 8′ ball mill at this large northern New York zinc mine. The mill is operating *24 hours a day, six days a week*... grinding rod mill discharge consisting of sphalerite, pyrite and the balance silicate and limestone gangue.

These Amsco liners ground 670,000 tons during their 29-month life... as against an average of 286,000 tons and 13-month life for the type of liners previously used. That adds up to over *100% increase in service life*. In addition to their longer life, another fact that impresses the operators about Amsco liners is that there's no circumferential grooving until the very end of their service life.

TUSCARORA CONSTRUCTORS HAVE FOUND...

AMSCO 2-PART DIPPER TEETH ARE "BEST-WEARING TEETH WE'VE EVER USED"

At the Niagara Power Project, Tuscarora Constructors are building the power station and pumping station. They're digging almost entirely in rock, working their dippers 24 hours a day, six days a week.

Dell Lundmark, Equipment Superintendent for Tuscarora, was responsible for selecting Amsco 2-part reversible teeth for his dippers. He'd heard of their fine performance elsewhere, and now describes them as the "best wearing teeth we've ever used". He says the design of the teeth is very good for rock, and adds, "We're getting *15% to 20% longer wear* than from competitive 2-part teeth".

Approximately 10,000 tons of rock are handled before the teeth are turned over ... and tips are easy to replace when completely worn.

This combination of a new alloy steel, plus the design features engineered into the Amsco Simplex Teeth, are causing equipment superintendents everywhere to change to Amsco for better, lower cost digging.

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American Manganese Steel Division • Chicago Heights, Ill.

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Rock, falling into the breaking chamber is shattered by the hammers and hurled forward through the upper screen grate. Oversize, falling into the second rotor hammers, is reduced to size and discharged. The rock always moves in a straight-line flow because the hammers turn in the same direction. All finished material is immediately removed from the breaking chamber.

Less power is required to get this high production. You get more tons per hour at a lower cost. And the highly cubicle finished product meets today's rigid specs. Gradation is controlled by simple adjustments.

Enjoy the *extra* dollar and cents benefits of Impact Master's Straight-line Flow. Just contact your Universal distributor for complete information.

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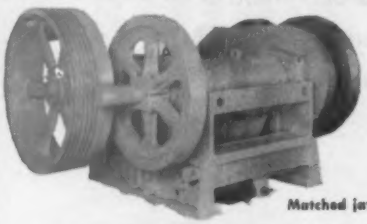
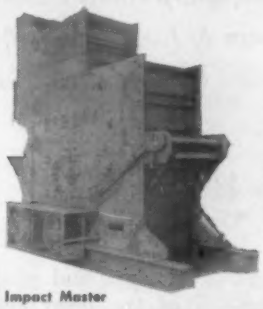
UNIVERSAL *Systemized* ENGINEERING means EXTRA production . . . EXTRA profit!



Matched jaw crusher



Double rotor Impact Master

PRIMARY CRUSHING

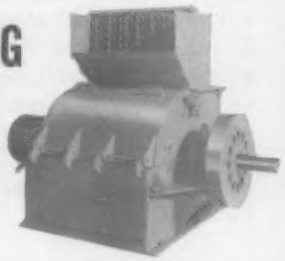
No guesswork about primary crushing with *systemized* planning . . . careful analysis of your pit or quarry tells you which type of primary crusher you need to get those extras. **Single jaw crushers, matched jaw crushers and Impact Masters** are available. Universal *systemized* engineering will tell you which will be best for your needs. Full line of feeders, to fit the crusher, available too!

Single rotor Impact Master

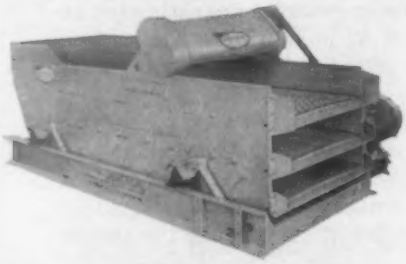
Roll crusher

SECONDARY CRUSHING

Perfectly balanced production of secondary crushing with your primary is possible only through *systemized* planning. Your specs and market tell you which machine is best suited for your plant. Universal's wide range of sizes in **roll crushers, Impact Masters, hammermills and cone crushers** puts the right machine in your production and profit team.



Hammermaster Hammermill



Screenmaster Horizontal Screen

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Positive, snappy screening with **Universal's Screenmaster horizontal screen** assures high volume separation without blanketing or blinding. Exclusive rubber bushed phasing bars and air springs eliminate production robbing "cornering".

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Wobbler Feeder

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Market dictates new plant's design

High capacity, tougher specs, sharp competition spurred development of Evans, Coleman & Evans' 650-tph. automatic sand and gravel plant near Vancouver, B. C.

by John H. Bergstrom

CUSTOMER NEEDS for high-quality sand and gravel and the potential demand of a vast market were the determining factors in the design of a huge new aggregates plant near Vancouver, B.C. Evans, Coleman & Evans, Ltd., realized that its market was outstripping the productive capacity of its Mary Hill plant. Rather than plow ahead to modernize the existing installation, management engaged a consulting engineering firm to study the feasibility of a complete new aggregate processing system.

Heartland of thriving British Columbia, the Fraser River Valley would doubtless demand a plant output of more than 1,000 tph. by 1965. The firm also had to face the fact that the wide range of concrete construction anticipated even before that date would demand a wider range of specification aggregates than the existing plant could ever make economically. Finally, soaring wage rates and highly competitive selling prices made it imperative that production be regulated with automatic controls of advanced design.

Translated into design and construction costs, studies on the "dream plant" anticipated an investment approaching $3 million. But close cooperation with the engineers enabled the management to evolve a two-stage plant. A highly efficient 650-tph. plant would be built first; later it would be expanded to 1,000 tph. to match the needs of the expanding market.

Happy result of planning was an installation costing $1.7 million. The first stage alone is one of the largest sand and gravel plants in Canada. It incorporates all the original concepts of automatic control and production flexibility to make it one of the most efficient aggregate plants in North America.

Substantial savings were achieved by the canny use of existing production equipment and storage silos. This permitted the new plant to go into production months ahead of schedule and, at the same time, the old machinery was working at full capacity while new equipment was being installed all around it.

The new plant is located at the junction of the Pitt and Fraser Rivers, about 23 miles east of downtown Vancouver, a strategic spot to make economical water shipment to major construction sites in the area. Proven reserves are estimated at a century's supply of 50 million tons. The aggregates cover an area of about 350 acres, to a depth of about 250 ft.

The rich deposit was not without processing problems over the years. A 1929 installation was replaced with a 200-tph. plant in 1954. It could produce washed or crushed aggregates alternately but only with costly downtime to make the switch in products.

A vein of a particularly sticky clay makes it imperative to add heavy-duty scrubbers to an already unwieldy system. When core drilling in 1958 proved that the clay persisted throughout the deposit, a completely redesigned plant became almost imperative.

Four major production sections make up the huge new installation. Three men can operate the whole system with the vital assistance of auto-

Please turn page

Here's how the equipment is arranged in the big Canadian sand and gravel plant

1. 75-ton truck dump hopper

2. Stephens-Adamson 5 x 25-ft. manganese steel apron feeder

3. Fixed grizzly with 5-in. spacing

4. Allis-Chalmers 42 x 48-in. primary jaw crusher

5. Merrick belt scale

6. Two Allis-Chalmers 7 x 16-ft. dd. vibrating screens

7. Two McLanahan & Stone 8 x 14-ft. rotary scrubbers

8. Allis-Chalmers 5 x 14-ft. dd. vibrating screen

9. Allis-Chalmers sand slurry pump

10. Two WEMCO 8 x 32-ft. sand-sort tanks

11. Three WEMCO 54-in. x 26-ft. screw washers

12. Two Allis-Chalmers 3-stage fresh water pumps

13. Smith Engr. Works Div. 4 x 10-ft. dd. vibrating screen

14. Two traveling reclaim hoppers

15. Two Allis-Chalmers 6 x 14-ft. dd. vibrating screens

16. Nine Jeffrey vibrating feeders

17. Allis-Chalmers 7 x 16-ft. dd. vibrating screen

18. Two Merrick belt scales

19. Traveling reclaim hopper

20. Auxiliary truck dump hopper

21. Auxiliary fixed grizzly

22. Smith Engr. Works Div. 25 x 36-in. jaw crusher

23. Two Smith Engr. Works Div. 4 x 10-ft. dd. vibrating screens

24. Smith Engr. Works Div. 36-in. cone crusher

24a. Nordberg Mfg. 48-in. cone crusher

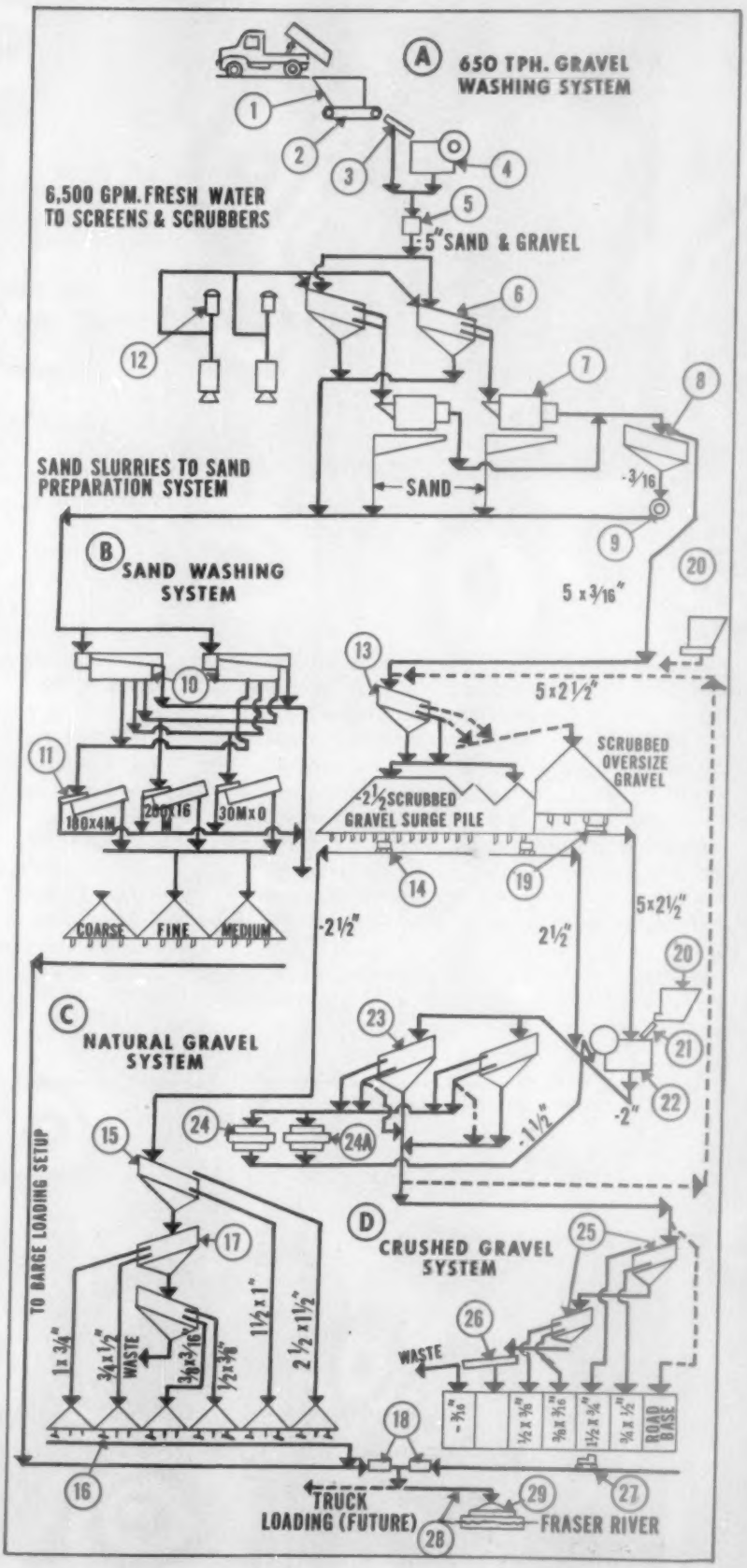
25. Two Nordberg Mfg. 4 x 10-ft. dd. vibrating screens

26. Dewatering flume

27. Traveling reclaim hopper

28. Barge-loading conveyor at 1,500 tons per hour

29. Steel barges for water shipment on the Fraser River



MARKET DICTATES PLANT DESIGN . . .

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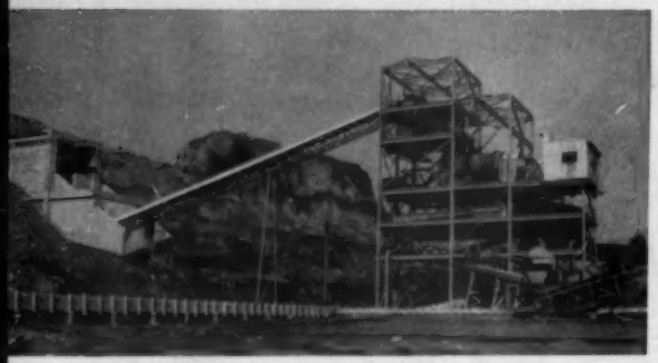

Probably the most important part of the plant is the first tower with its two rotary scrubbers that polish off a sticky clay from the gravel

matic control. All four processing segments are controlled from two centers. The first is located in the scrubbing tower, where the primary crusher and all scrubbing and sand classifying operations are controlled. A second center, located in the screening tower, controls reclaim from intermediate storage and all final sizing operations. All controls are interlocked so that in the event of a mechanical failure all affected equipment will shut down automatically and in proper sequence. At start-up, all equipment resumes operation in the proper sequence.

A gravel scrubbing and sand removal system comprises the first section. Sand is then classified to produce fine, medium and coarse sand ready for shipment. Natural gravel is screened into six products, while crushed gravel is processed to yield as many as seven products, including crushed sand. All of these materials may be blended as they are drawn into the 1,500-tph. barge loading system.

The gravel pit rises about 250 ft. above the level of the river, and it is now being worked in two benches. Gravel is so uniform that there are very few pieces too large for the 42 x 48-in. primary jaw crusher. A 3½-cu. yd. shovel loads the six 19-ton rear dump trucks for the short haul to the hopper above the crusher.

A 5 x 25-ft. apron feeder under the truck hopper distributes the pit run material to a 6-in. grizzly. Oversize from the grizzly goes to the 42 x 48-in. jaw crusher where it is reduced to minus 5 in., and joins the through-grizzly material on a 36-in. belt conveyor carrying both to the top of the scrubbing and sand classifying tower. All material on this belt is automatically weighed and recorded to provide the essential information for inventory control.

First units in the scrubbing and classifying section are a pair of parallel 6 x 14-ft. double-deck wash screens. The top deck of each is a scalping deck to protect the lower from impact of the torrent of gravel coming on it. Oversize from both decks is chuted directly to two 8 x 14-ft., heavy-duty, trunnion-mounted rotary scrubbers. Gravel leaving the scrubbers is passed over a 5 x 14-ft. double-deck screen for additional washing. The

Please turn to page 147

Booming British Columbia needs plenty of the first-class aggregates made at this new plant on the Fraser River

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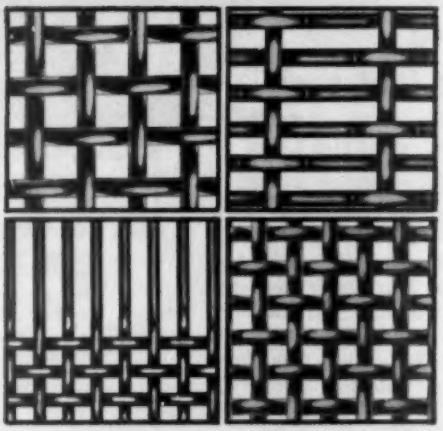

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MARKET DICTATES PLANT DESIGN . . .

continued from page 144

5 x $\frac{3}{16}$-in. scrubbed gravel is carried by a belt conveyor about a 400 ft. distance to the washed gravel storage area.

There a 4 x 10-ft. double-deck vibrating screen separates the scrubbed gravel into two fractions. One—a 5 x 2½-in. gravel from the top deck—is conveyed to one storage pile, the surge pile for the gravel crushing plant. Normally, all material passing the first deck of the screen is distributed across a second storage pile by a shuttle conveyor. An alternate arrangement allows some of this gravel to be used to supplement the oversize as feed for the gravel crushing plant. Minus 2½-in. gravel from the storage area is the raw material for the final washing and sizing of natural gravel. Total capacity of the two storage piles is estimated at about 15,000 tons.

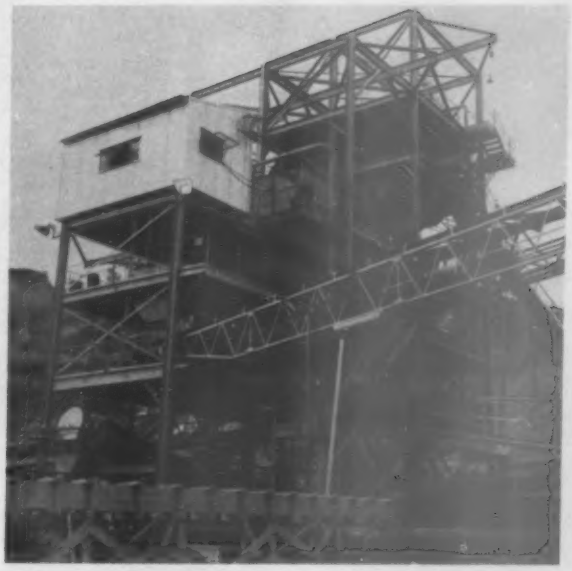
When it is necessary to bypass the primary crusher, there are two alternate methods of delivering pit run material directly to the intermediate storage area. One is an auxiliary truck hopper near the storage area that feeds an inclined belt conveyor which also discharges to the 4 x 10-ft. screen mounted above the stockpiles. This once was the feed point for the original plant. It has been retained for use when unwashed fines must be added to the crushed products. Also, material from the secondary crushing section can be recycled back to the intermediate storage area rather than being sent on for further processing. This is "road base," usually minus 1½-in. crushed gravel; but, of course, this size can be altered if it is necessary.

Sand is taken from three parts of the gravel washing system. All material flushed through the lower decks of the first scalping screens flows to the sand system. The minus $\frac{3}{16}$-in. sands from the two trunnion screens also flow to the sand preparation setup. Finally, the fines from the rinsing screen that follows the scrubbers are pumped to the sand sorting tanks. About 6,500 gpm. of wash water is used to process the gravel, and most of this water ends up in the sand system.

Two 8 x 32-ft. sand sorting tanks in parallel make the three coarse cuts of the sand. These are normally 4 x 180-mesh, 16 x 200-mesh and 30-mesh x 0 sizes. Each size is finished and dewatered in a 54-in. screw classifier and stockpiled with belt conveyors. Slimes from the sorting tanks and the classifiers are flumed to waste.

Scrubbed gravel for the natural gravel system is reclaimed from storage with a traveling reclaim hopper over a belt and delivered to the top of the

Please turn page



The compact sand system is tucked away under the gravel-washing screens in this control tower

Natural gravel is scrubbed and finished into 6 sizes in this 120-ft. screen tower

Seven storage silos for crushed gravel products were retained from an older plant on the site

MARKET DICTATES PLANT DESIGN . . .

continued from page 147

A 1,500-tph. barge-loading system draws on a 100,000-ton inventory to ship innumerable blends of finished aggregates

Three men and a battery of automatic controls regulate flow of sand and gravel through the Mary Hill plant

120-ft. high screening tower for final sizing. The first screen is a 6 x 14-ft. double-deck unit that produces two finished sizes: 2½ x 1½ in., and 1½ x 1 in. The minus 1-in. second deck product is sized by another 6 x 14-ft. double-deck screen. This screen also makes two finished products, 1 x ¾ in. and ¾ x ½ in.

The second deck fines, ½ x $\frac{3}{16}$ in. are again cut on a 7 x 16-ft. double-deck screen to make the final two finished sizes: ½ x ⅜ in. and ⅜ x $\frac{3}{16}$ in. All fines from this screen finally go to the waste settling pond.

The gravel crushing system takes its feed from three sources. Under normal operating conditions it takes raw materials from the surge pile of 5 x 2½-in. washed oversize. This material goes directly to a 25 x 36-in. jaw crusher to be reduced to minus 2 in. Natural gravel is another source of feed, particularly when smaller sizes of crushed gravel are needed. Three reclaim gates under the scrubbed gravel pile draw natural gravel into the system, but the gravel bypasses the jaw crusher in the process.

The third source of gravel comes into the system directly from the supply of raw material. Originally, the crushed gravel system made up the entire plant. It has been retained as an important segment of the new installation, and its feed hopper and primary jaw crusher now provide an auxiliary method of putting crushed raw gravel into the setup. A belt conveyor takes all material, crushed and natural together, to a pair of 4 x 10-ft. vibrating screens.

The top deck of both screens is usually fitted with 1½-in. screen cloth. Oversize from this deck is split between two cone crushers, a 4-ft. and a 3-ft. unit. Settings on these crushers can be varied to allow almost unlimited control over the sizes of the finished products. Both crushers drop crushed gravel to a collecting belt that recycles it to the two screens.

Lower decks on these screens take out the minus 1½-in. gravel. This size can be sent to roadbase storage, to the crushers or, more normally, carried on in the system to the two final sizing screens in series. These are both 4 x 10-ft. double-deck units, fitted wtih washing sprays. The first makes two finished sizes—1½ x ¾ in. and ¾ x ½ in.—for the steel storage silos. Fine materials through the screen go to the second unit where three more production sizes are prepared and put into steel storage bins. Smallest production size is

Please turn to page 150

Arnold Abbrot, with over 20 years' experience with the Kaiser Company, supervises the Kaiser Radum plant, one of the industry's most modern and efficient. Plant handles a feed of 1200-1300 TPH rock, gravel and sand.

KAISER specified WEMCO for RADUM plant

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Since it first began production in 1930, the Kaiser Radum Plant, in Pleasanton, California, has had a continuous record of successful operation. Capable management, a progressive program of modernization and expansion have made it one of the industry's largest—and most efficient.

Because of its record of outstanding, profitable performance in major aggregate plants, WEMCO equipment was selected for modernization of this 1200-1300 TPH sand and gravel plant. Four #78 WEMCO Sand-Preps receive material from scrubber section. Four #48 Sand-Preps wash and classify all #4 minus concrete sand (350-400 TPH). A #60 WEMCO Sand-Classifier (installed in 1952) handles rod mill discharge. Eight WEMCO Sand-Clones process Sand-Prep overflow water for recovery of fine sands.

High capacity trouble-free WEMCO equipment combined with Kaiser's advanced production, flexible handling and blending techniques, enable the Radum Plant to meet even the most recent specifications and the demands of a highly competitive market.

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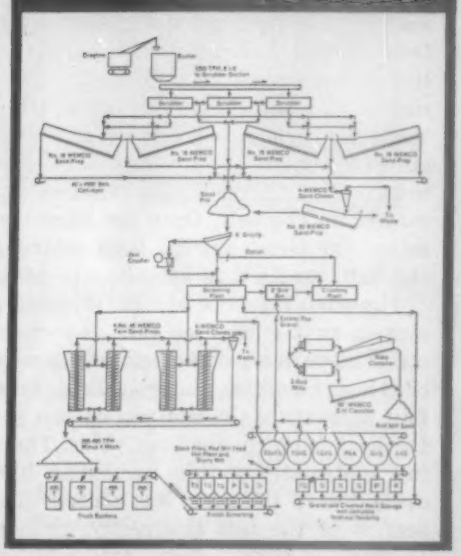

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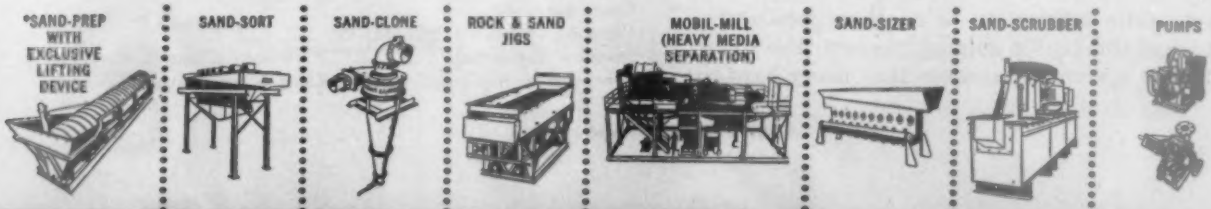

MARKET DICTATES PLANT DESIGN . . .

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a minus $\frac{3}{16}$-in. crushed sand that is first put over a dewatering flume. Waste water and entrained slimes are sent to the waste pond.

The new plant's blending and high-speed shipping system is one of its important and outstanding features. Here's how it works.

Under each of the three finish storage areas is an 8 x 8-ft. concrete reclaim tunnel with a 42-in. belt conveyor. These reclaim conveyors discharge material from the stockpiles to a pair of inclined conveyors leading to the 60-ft. high load-out tower at the river's edge. One inclined belt carries either sand or gravel, while the other carries only crushed gravel. Both conveyors discharge material to a shuttle conveyor housed in the load-out tower and projecting over the river.

The shuttle conveyor moves back and forth to spread the load laterally across the barge docked below; the barge is moved backward or forward by a winch mounted on the dock. This same shuttle conveyor is a key unit in future truck loading plans. It will then project from the tower on the side away from the river; the belt can be reversed to load trucks.

Automatic controls for the blending and loading operation are housed in the same tower. Any type material can be blended and loaded automatically from this control point. The operator first plots the settings required to blend the type and quantity of material to fill each order. He then selects the roper reclaim belt and presets the controls on either air-operated gates or vibratory feeders. The total material loaded is governed by a precise time control on the belt. Once the operator has determined the blend, set the time control and started the belt, no further attention is necessary.

Time-delay relays are an integral part of the system that guarantee that any cross section of material on the reclaim belt will be a perfect blend of the specification material. To do this, the relays first accentuate the controls on the gate or feeder farthest from the load-out point. The rest supplying material for this particular blend are not opened until the relay has sensed that the loaded section of the belt is directly underneath. When the system is shut down, this relay arrangement operates in reverse, closing each gate or feeder just as the last material on the belt passes underneath the feeder.

Automatic lubrication is another pace-setting feature of this highly automated plant. The timer-controlled system guarantees that many hard-to-reach points will receive regular lubrication. It is expected that in one year this system will pay for itself in labor and lubricant savings.

As an extra feature for both control and safety, trip wires run near all major processing units and along all conveyors. A quick tug on one of these wires immediately shuts off all equipment ahead of that point. This allows any abnormal condition to be corrected without the time lag required when an operator must go to a central control point.

The plant's stockpiles currently contain 15 types and sizes of aggregates. These include: 6 sizes of natural gravel; 3 of natural sand; 4 of sized crushed gravel; road-base material, and a crushed sand. Reclaim and loading system controls allow the exact blending of any of these materials to meet virtually any aggregate specification.

Barges are currently carrying the plant's entire output to Vancouver and other Fraser River points. However, arrangements have been provided for truck loading, if this method of shipment should become more widespread. Aggregates can be loaded in about 20 min. This high capacity, coupled with an inventory of nearly 100,000 tons, means that aggregates can be supplied quickly and simply to meet any conceivable demand. Evans, Coleman & Evans has a fleet of 70 barges and 9 modern tugs available to move material to market.

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Haul trucks, 19-ton, (6)	Euclid Div., GMC
Apron feeder, 5 x 25-ft.	Stephens-Adamson Mfg. Co.
Vibrating screens, 7 x 16-ft. dd. (3)	Allis-Chalmers Mfg. Co.
6 x 14-ft. dd. (2)	Allis-Chalmers Mfg. Co.
5 x 14-ft. dd. (1)	Allis-Chalmers Mfg. Co.
Belt scales, (2)	Merrick Scale Mfg. Co.
Rotary scrubbers, 8 x 14-ft., (2)	McLanahan & Stone Mfg.
Sand sorting tanks, 8 x 32-ft., (2)	WEMCO Div., Western Machinery Co.
Spiral classifiers, 54-in., (2)	WEMCO Div., Western Machinery Co.
Vibrating feeders, (9)	The Jeffrey Mfg. Co.
Conveyor idlers	Stephens-Adamson Mfg. Co.
Conveyor belts	Boston Woven Hose Co.
Electrical controls	General Electric Co., Allen-Bradley (Canada), Ltd.
Automatic lubricating system	Howard Martin & Co.
Barge winch, (2)	Washington Iron Works
Jaw crusher, 25 x 36-in.	Smith Engineering Works
Cone crusher, 3-ft.	Smith Engineering Works
Vibrating screens, 4 x 10-ft. dd., (3)	Smith Engineering Works
Cone crusher, 4-ft.	Nordberg Mfg. Co.
Vibrating screens, 4 x 10-ft. dd., (2)	Nordberg Mfg. Co.
Design & Engineering	Western-Knapp Engr. Co.
Construction	John Laing & Son (Canada), Ltd.

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White cement debuts on West Coast

by Joseph N. Bell

IN JUNE of 1961, the Riverside Cement Co. will put into operation the nation's fifth white portland cement plant and the first new plant completed west of the Rockies for the sole purpose of producing white cement. Located cheek-to-jowl with Riverside's long-existing Crestmore plant, a few miles west of Riverside, Calif., the new white plant is moving into a field sparse with competition and dotted with the skeletons of other producers who have tried to manufacture this technically difficult type of cement.

There are presently only four white cement plants in the United States: Medusa in York, Pa. (1909); Universal Atlas in Northampton, Pa. (1910); General's Trinity plant in Houston, Texas (1941); and the Trinity plant in Tampa, Fla., completed in 1957. These four plants presently share a domestic market for white cement of almost 2 million bbl. of which about 300,000 are imported —mostly into Florida. Sales are divided fairly evenly among the four existing plants.

Where and how is white cement used? Thorough market analysis carried out by Riverside before entering the white cement field showed the principal markets to be: *Please turn page*

Security keeps cameras at a distance from Riverside's new white cement plant at Crestmore. There, the 300,000-bbl. installation shares quarry and personnel with existing gray cement plant

WHITE CEMENT ON WEST COAST . . .

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1. Swimming pools, including both the plastic coat given the inside of the pool and the coping around the pool;
2. Exterior stucco;
3. Terrazzo;
4. A broadening range of concrete products, including curtain walls and decorative block and stone;
5. Paints and tile grout.

W. N. Kopenhefer, superintendent of the white cement plant, stands by one of the signs ringing it

Part of the new plant's technical success depended on close attention to construction details. C. W. Cosby, general superintendent, points out a critical detail to Plant Superintendent W. N. Kopenhefer (right) and his assistant, W. R. Ryan

"However," said R. E. Hyche, Riverside's marketing manager for White Cement, "we expect this picture to change somewhat. The rate of pool growth in the future may tend to stabilize at a somewhat lower level than has been experienced in the last few years, and exterior stucco is having its problems with competitive materials and rising labor costs. We hope to do something about this—or at least to try. But we see the future for white cement principally in three marketing uses.

"The greatest growth will be among product manufacturers. Plastic forms now offer much greater possibilities for beauty as well as strength in concrete, and we think white cement will be important in this picture. For the same reason, we expect the structural uses of white concrete to increase dramatically. The same prospect holds for terrazzo. Terrazzo flooring in this area is now frequently comparable with vinyl tile in cost and requires little or no maintenance.

"We anticipate selling the majority of our initial production of white cement in southern California. However, we don't intend to restrict our sales operations to such a small area, but expansion will have to come slowly. And, of course, the further we reach out from our base of operations, the tougher will be the competition."

At the present time, the majority of white cement needs on the Pacific Coast are being supplied from Texas, Pennsylvania and Japan. About 25,000 bbl. of white cement came into California last year from Japan.

"We'll move into this market carefully," said Hyche. "First of all, we must demonstrate the quality of our product to customers in this area. Then, we have to come up to full production gradually. All this will take time, but we intend to move as quickly as we can commensurate with sensible and orderly marketing and production progress. We hope to have our first saleable product by about June 1 of this year."

This sort of frankness is highly unusual in the domestic white cement business. Few industries—both here and abroad—are so veiled in secrecy as the production of white cement. White cement plants are generally closed to the public and to the press. It is nearly impossible for a visitor to obtain permission to go through a white plant without some very special sort of dispensation.

Why all this cloak-and-dagger aura about the production of white cement? There are three primary reasons:

► Because it is produced by relatively few man-

Please turn to page 156

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WHITE CEMENT ON WEST COAST . . .

continued from page 154

ufacturers, white cement offers an especially profitable market for those producers who can lick the technical bugs inherent in its production. Therefore, the means by which this is accomplished becomes a rather valuable competitive secret.

► The production of white cement poses some difficult and touchy technical problems—much more so than the production of normal gray portland cement. Such otherwise prosaic operations as the controls exercised at various points in the manufacturing process, the length of the kiln used, the type of deposits employed, all contribute to the solution of these technical problems, and disclosure of them would make it possible for other manufacturers to find a considerable shortcut into the white cement business.

► Since the manufacture of white cement is technically difficult, there are no degrees of success. It is either brought off or it isn't, and several companies have lost a considerable amount of money in trying to shortcut the process unsuccessfully. Therefore, a successful system of manufacturing acceptable white cement is a considerable asset peculiar to the company that has developed it—which is understandably reluctant to give it away.

"This secrecy is something out of keeping with our past policy," Con Cosby, Riverside's general superintendent, told me. "Until the white cement plant came along, we made it a company policy to show any and all of our facilities—including our computer program, which we pioneered in the cement industry—to anyone genuinely interested. But it will be our policy to operate the white cement plant under tight security regulations."

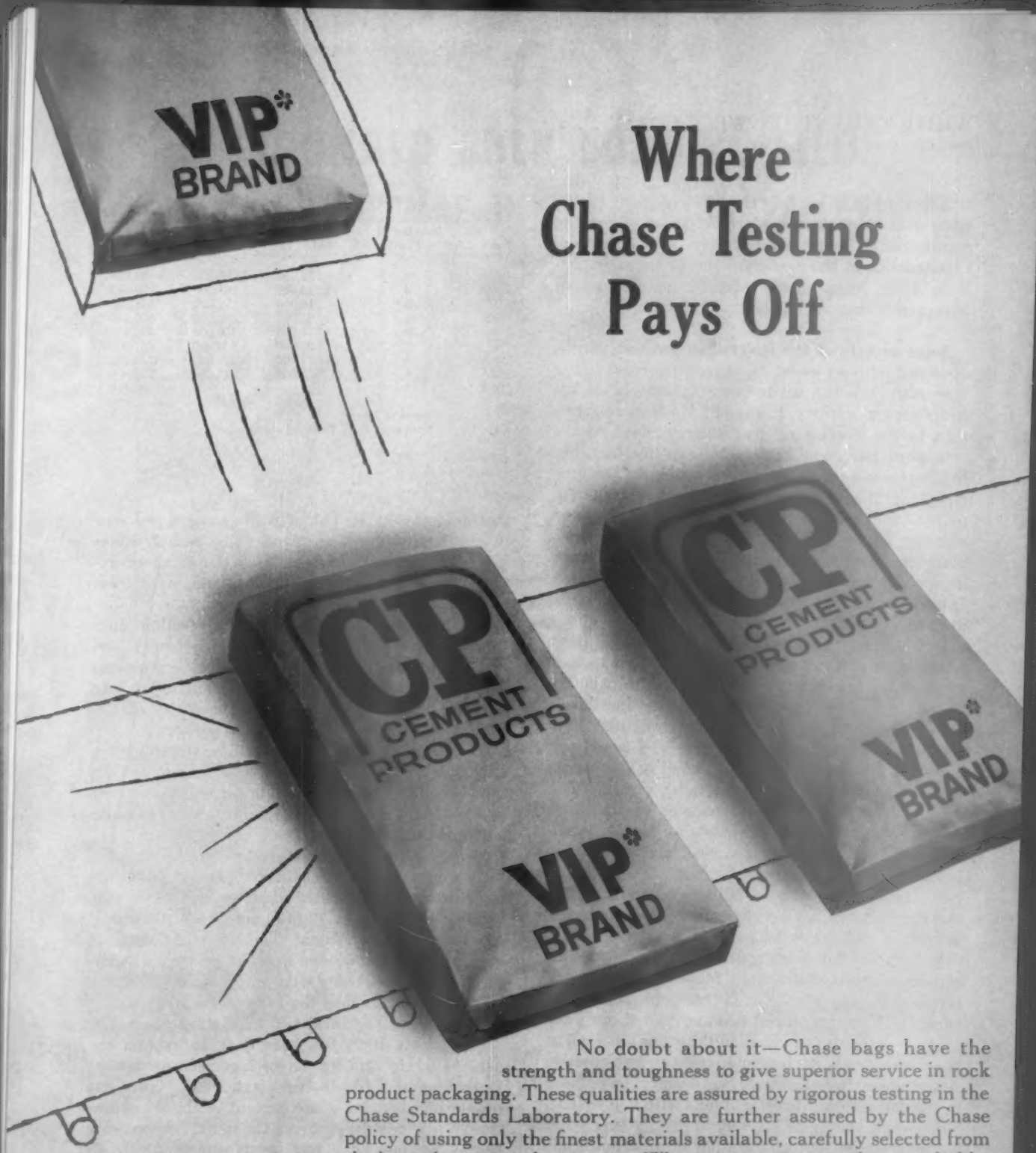
Riverside made its first economic studies on white cement in 1956. At that time, there was no specific plan to move into this field; the study was made simply as part of a general study of the over-all cement market. When the economic opportunities for white cement looked good, detailed studies on plant costs were made and a source of raw material was sought. When it was discovered that the materials being mined for Riverside's Crestmore plant were highly satisfactory for white cement, Riverside was off and running.

Since then, the company has been talking and thinking white cement with growing frequency and excitement. After testing and proving its raw materials, Riverside—in 1958—dispatched Howard Starke, then director of engineering, and Sophus Rikhof, chief engineer, to Europe to inspect white cement facilities on the Continent.

After the two returned from Europe, there was a great deal of study and discussion of the reports they brought back. Then, in the late Fall of 1959, Riverside decided to go ahead with plans to build its own white cement plant. After that decision was made, Mr. Cosby and Bill Kopenhefer, superintendent of the white cement plant, made another

Please turn to page 158

White cement will be packed and shipped in Riverside's highly automatic pack house



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WHITE CEMENT ON WEST COAST . . .

continued from page 156

trip to Europe to explore the white cement operations over there in considerable detail—from the standpoint of both plant design and operation. Construction of the new plant actually started early in 1960, immediately adjacent to the site of Riverside's Crestmore plant.

Some aspects of the Riverside operation can be disclosed without violating any confidences:

► Although the white cement plant is an entirely separate entity, it was built in close relationship to the Crestmore gray cement plant so the two operations could share some common facilities in the interests of economy. For example, the lime rock from the underground mine is shared by both plants, and they have the same conveying and primary and secondary crushing system. The primary crusher consists of a 60 x 82-in. jaw crusher in combination with an 800-hp. hammermill, which is in closed circuit with screens producing a ⅜-in. product.

► The two plants also share the same pack house, a remarkable new operation that makes use of an automatic palletizer that is able to palletize 1,200 bags of cement per hour. Riverside developed this system when a company engineer saw the automatic palletizing of sugar and asked the manufacturer to work with Riverside in coming up with a similar system for portland cement. The automatic palletizer—which reduces the required work force in the packing plant by six men—has been in operation for about a year, and has proven itself many times over.

► Some plant personnel (Riverside would rather not say how many) are interchangeable between the white and gray plants.

► The new Riverside operation is the only white cement plant in the United States using the dry process. Why? "We debated this point for a long time," a Riverside official told me. "All of our gray plants use the dry process; on the other hand, all of the white plants we inspected use the wet process. After much investigation, we decided to pioneer in the domestic white cement field with a dry plant. Now we're very glad we did. We're getting what we believe is a better blending of raw materials by the dry process."

► The Riverside white cement plant has been designed and constructed in such a way that its facilities and equipment—including another kiln and necessary mills—can be doubled with a minimum of additional investment and effort.

► About 20 people will be used to operate the white cement plant, which will produce between 200,000 and 300,000 bbl. of white cement per year in the beginning. The plant will operate under what Riverside officials call "departmentalized automation"—with an eye toward even more complete automation in the future.

White cement in the United States

Year	Number of Active Plants (Y)	Production bbl. (Y)	Shipments bbl. (Y)	Imports (X)
1952	4	1,100,000	1,085,000	13,000
1953	4	1,114,000	1,091,000	78,643
1954	4	1,110,000	1,153,000	193,000
1955	4	1,191,000	1,205,000	300,170
1956	3	1,171,000	1,130,000	449,000
1957	4	1,087,000	1,024,000	267,000
1958	4	1,377,000	1,237,000	280,000
1959	4	1,525,000	1,515,000	280,400
1960	4			280,600

(Y) U. S. Bureau of Mines
(X) Official Statistics U. S. Dept. of Commerce

► The new plant has radiation cooling duct work between the kiln and multiclones to (1) lower the temperature of gases that go into the glass bags, and (2) hold down the CFM flow to the bag house. The cooling prevents the necessity of letting in ambient air, which increases volume.

The entire cement industry will be watching the Riverside white cement plant with uncommon interest. In few other production fields is know-how as important as it is in the manufacture of white portland cement.

"Yet," John Kinard, Riverside's president, said, "any competent and responsible cement manufacturing company, provided with experienced outside help and the proper high-quality raw materials, could make white cement. The trick, of course, is acquiring the knowledge and the proper raw materials. And then being willing to take the business risk necessary to reap the rewards implicit in this rather touchy technical and marketing operation.

"Relatively little has been done to expand the uses of white cement. There has been an almost static demand for it for some years. Yet, the marketing field for white cement is almost unlimited. White cement removes the limitation on color that sometimes holds back gray cement. Although it costs about twice as much as gray cement, this item is insignificant in the total cost of a structure in which beauty is important. And the white cement building is almost maintenance-free. If the demand for white cement grows as we expect, we hope we're responsible for it. At least, we plan to be around with a good product when it happens."

END

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Cement Co.
Bath, Pa.

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A COMPLETE CEMENT PLANT

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Initial link is hauling raw limestone to primary crusher. At Ideal Cement's Ada, Okla., plant, fleet of LVX Mack four-wheel dumpers keeps three shovels, including big six-yard dipper, hustling.

STRONG LINKS
in the cement-making chain

With seventeen manufacturing plants, **Ideal Cement Company** is a leading cement producer in the U. S. In the past two years, Ideal has opened new plants at Ada, Oklahoma, and Tijeras, New Mexico.

Each of these new plants is a continuous unbroken cement-making chain. Strong links in these chains are the Mack trucks used to carry limestone from quarry face to crusher. At Ada, for example, Mack LVX's keep pace with three shovels, providing a constant supply of raw material. At its Tijeras quarry, Ideal depends on LRX Macks.

Macks make these all-important links stronger because they are far less likely to fail prematurely . . . require far less maintenance attention . . . and operate at remarkably low cost per ton hauled.

The reasons are easy to recognize. Mack components such as Mack-built transmissions . . . axles . . . frames . . . make up a vehicle that stands up and keeps coming back for more when pitted against truck-punishing jobs.

Make sure you have all the truck you can get under your shovels. Put a Mack to work. Mack four- and six-wheel off-highway dumpers from 15- to 45-tons capacity really put muscle into your quarrying operation. Mack Trucks, Inc., Plainfield, New Jersey. Mack Trucks of Canada, Ltd., Toronto, Ontario.

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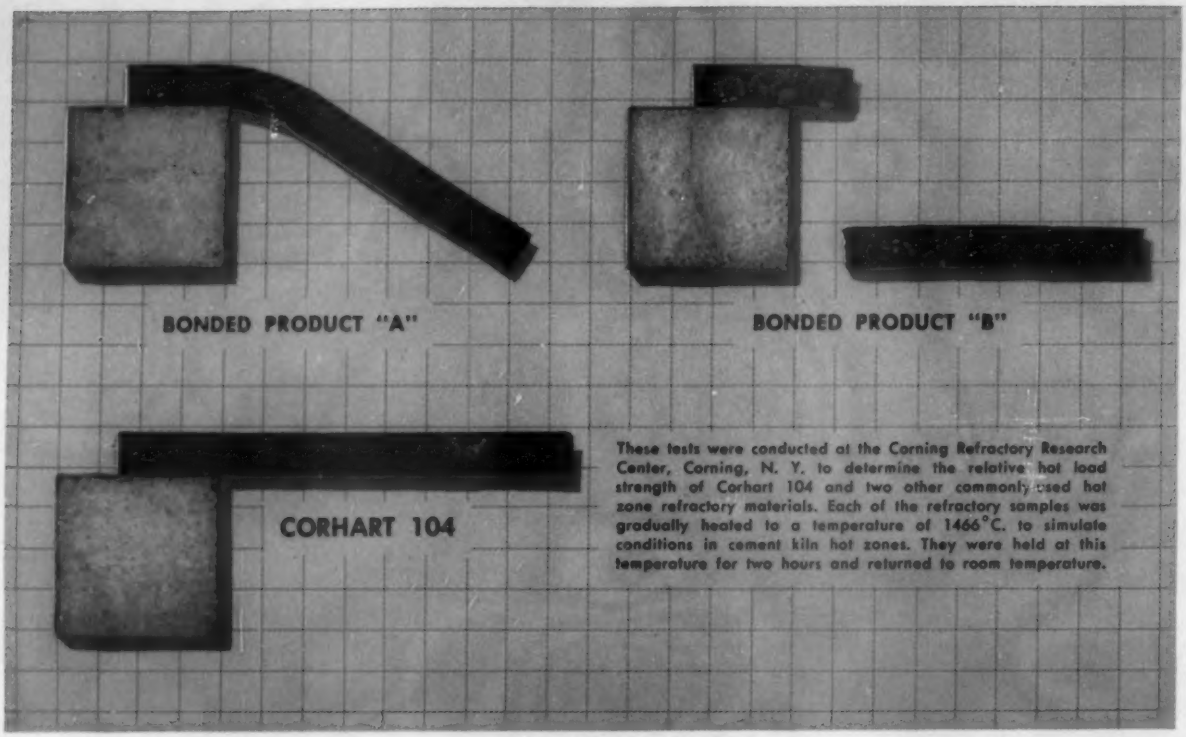
MACK
FIRST NAME FOR
TRUCKS

Discharging its load into apron feeder, Mack LVX will soon be ready for return to shovel. Quick spotting at shovel and dump site attests to Macks' maneuverability, good driver vision.

Raw material of portland cement, limestone, is loaded into Mack LRX dumper at Ideal's new Tijeras, N. Mex., plant. Despite grueling pace, Macks require minimum time out for maintenance . . . return long, trouble-free life.

CORHART PROVES IT IN THE HOT SPOTS!


BONDED PRODUCT "A"
BONDED PRODUCT "B"
CORHART 104
These tests were conducted at the Corning Refractory Research Center, Corning, N. Y. to determine the relative hot load strength of Corhart 104 and two other commonly used hot zone refractory materials. Each of the refractory samples was gradually heated to a temperature of 1466°C. to simulate conditions in cement kiln hot zones. They were held at this temperature for two hours and returned to room temperature.

CORHART 104 HOT LOAD STRENGTH halts premature ring failures!

MANY leading cement producers are substantially increasing kiln output by utilizing Corhart 104 as their hot zone refractory. Its extremely high hot load strength (see above) is one of the primary properties responsible for helping eliminate costly premature repair shutdowns.

Corhart 104 is manufactured by an exclusive fusion cast process which creates a strong, non-porous interlocking crystalline ceramic structure. It is electrically-melted at temperatures exceeding 4500° F., giving it a built-in 1000°F. "margin for error." The high hot load strength of Corhart 104 gives you a stable refractory unaffected at temperatures where conventional basic refractories begin to soften.

High hot load strength is only one of *many* Corhart 104 properties responsible for its superior resistance to the abuse of thermal cycling, sustained high temperatures and abrasion in the most severe wear areas of cement kilns. As a result, Corhart 104 consistently outlasts other hot zone refractories by at least 2-to-1.

A Corhart engineer will be glad to help you better utilize conventional refractories in a Corhart "Balanced Lining." Corhart Refractories Company, Incorporated, 944 Commonwealth Bldg., Louisville 2, Ky.

QUALITY ECONOMY ENDURANCE

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Cement famine ends on Hawaii as 1-million barrel plant comes into production

From austerity to prosperity...

by John H. Bergstrom

CONCRETE FOR CONSTRUCTION is essential for Hawaii, just as it is in any tropical climate. Only concrete has resistance to dampness, termites and many of the ills that plague wood or steel structures in the tropics. Large quantities of high-quality aggregates are another spur toward the greater use of concrete in the Islands.

Although per capita consumption of cement is lower than many of the other 49 states, concrete plays a more vital part in the state's construction industry than any other material. The low per capita consumption of cement is attributed only to the fact that concrete highways are virtually nonexistant on the Islands. Local production facilities will certainly change this situation. One concrete highway is already under test with State highway officials carefully evaluating the results.

But for many applications, Hawaii's use of concrete probably exceeds that of any other state. Prestress is an outstanding example. Over a third of the buildings currently under construction use prestressed concrete. The high cost of shipping steel to the Islands makes savings of 20 to 30 percent possible with the use of prestressed members.

Although there is some disagreement among Island sources as to the extent of future growth in Hawaii's construction industry, all agree that 1960's total construction expenditures of $200 million will at least reach $250 million by 1965. There is universal agreement that concrete will play an

Please turn page

Preheaters dominate the big kiln of Hawaiian Cement Corporation at Barber's Point, Oahu, Hawaii

FROM AUSTERITY TO PROSPERITY . . .

continued from page 163

increasingly important role in the local construction picture.

One of the principle problems of the local building industry has always been the lack of locally produced building materials. The Islands have always been entirely dependent on material shipped from the mainland to meet their building needs. Because of this, concrete construction flourished in the Islands. Even though cement has to be shipped in from the mainland, as well as wood or steel, the shipping charges were proportionally less and it could be fabricated locally. With other materials, fabrication was always a problem since facilities were always at least 2,400 mi. away.

The Hawaiian Cement Corp. was formed in 1959 to overcome this problem. It is owned by a combination of mainland and Hawaiian interests, among them the American Cement Co. Hawaii's Governor Quinn, in a speech at the plant's dedication, characterized the Hawaiian Cement Corp. as "a skillful blending of Mainland money and know-how with local financing, local knowledge and local contacts."

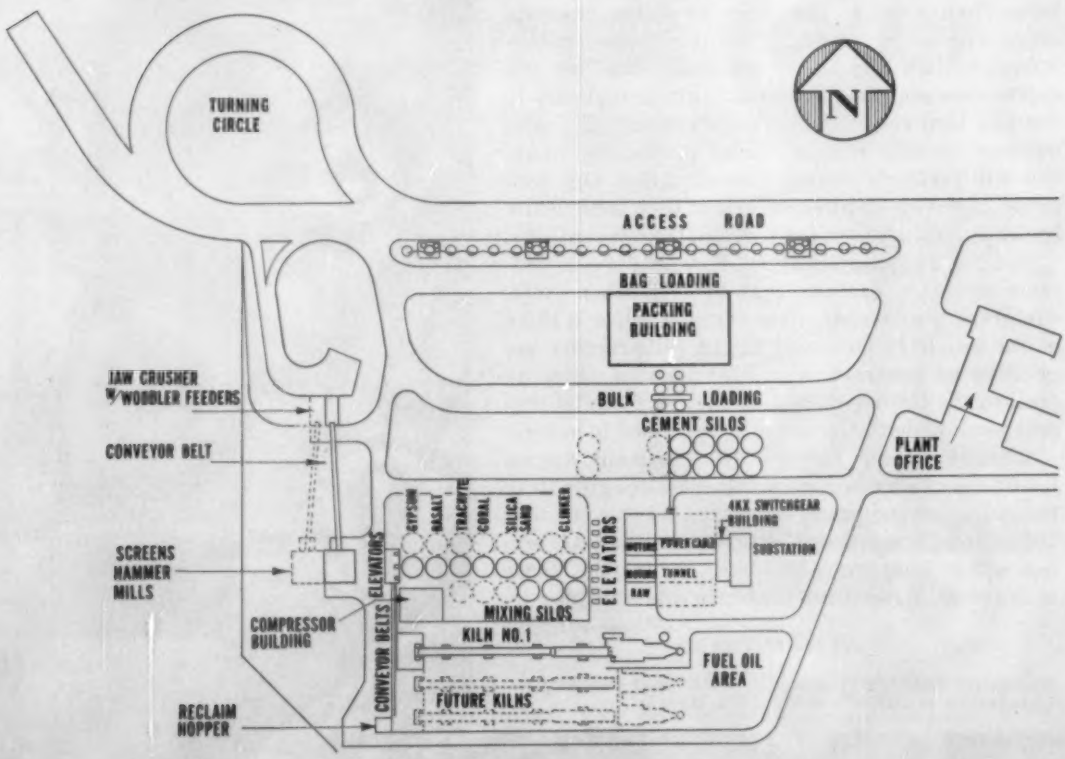
The Hawaiian Cement Corp.'s faith in the Hawaiian economy was clearly stated by President Robert D. Fisher at the plant dedication. "We believe that the Islands will grow in population, economic strength and national importance, and have invested our money on that basis," he said. "The cement industry will join oil refining, steel fabricating and other heavy industries contributing to the strength of the Hawaiian economy."

The principals of the new corporation had carefully investigated sources of raw material and possible plant locations. As a result, a plant site was acquired on a 27-acre site near Barber's Point, about 22 miles from downtown Honolulu. A 533-acre limestone deposit about 3 miles from the plant site is its principal source of raw materials.

Design and construction of the 1-million bbl. plant was a joint venture by the Hawaiian Dredging & Construction Co. and the Bechtel Corp. Bechtel engineered the new facility, and Hawaiian Dredging did the construction work.

The new plant boasts a number of unusual features. Among them are: *Please turn to page 167*

The arrangement of equipment at the new plant is simple and straightforward



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To round out the picture, Bemis makes any type multiwall bag that the cement industry may need. Like to try our product and service? Just call or write.

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FROM AUSTERITY TO PROSPERITY . . .

continued from page 164

• Probably the most complete dust collection system ever installed in a cement plant, including 20 independent collecting circuits and a completely enclosed storage.

• An open design that exposes almost all process equipment. This greatly reduced initial plant cost and reduced future maintenance costs.

• An unusually compact layout as a result of the extensive use of elevators in preference to extended belt conveyors.

• The use of a "zone concept" in the initial plant design that simplified and speeded the over-all engineering work.

An extensive dust collection system is the result of Hawaiian Cement's desire to comply with local air pollution regulations and to operate a plant that could not be considered objectionable by even its most fastidious neighbors. Result is a plant with complete dust collecting facilities that start at the raw material hoppers and continue throughout the plant. Every possible source of dust is enclosed, including raw material storage and belt conveyors.

Two 1,190-sq. ft. bag collectors with 12,000 cfm. exhaust fans trap dust from the two raw material receiving hoppers, the secondary crusher, and all the material handling systems ahead of the raw material storage silos.

Three 1,870-sq. ft. bag collectors serve the eight raw material storage silos and their associated material handling equipment. A pair of 6,120-sq. ft. units trap dust at the discharge end of the raw mill. Two bag collectors are also incorporated in the finish milling circuit—a small unit at the feed end, and a larger unit at the discharge.

In addition to the kiln dust collecting system, four other dust collecting circuits are incorporated in the burning area. One traps dust generated in transfering raw materials to the kiln feed bin; a second collects dust from the sampling area; a third from the alkaline dust hopper, and the fourth from the clinker cooler.

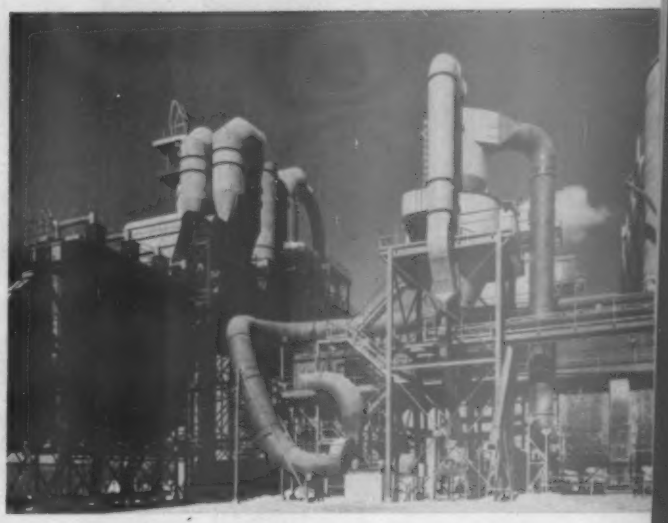
Four bag collectors serve the cement storage silos, the two bulk loading points and the packhouse. A bag collector has also been provided to trap dust generated by the homogenizing silos.

The kiln dust collection system consists of two cyclones operating in series, followed by a four compartment electrostatic precipitator. Material trapped by the cyclones is returned directly to the kiln. Before reaching the cyclones, the kiln gases are passed through a two-section gas cooler.

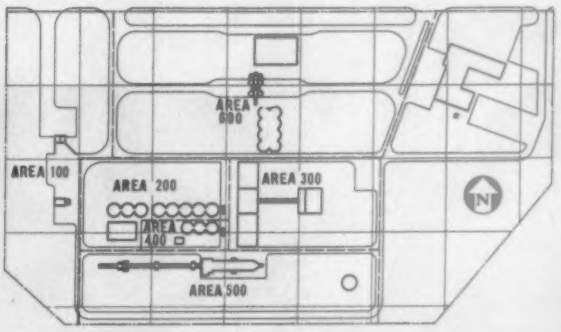
Location proved to be a key consideration in the design of the plant. Prevailing winds near Barber's Point on the southwest corner of Oahu, are all from the northeast while an intervening row of hills intercepts most of the moisture carried across the island. Although the adjoining valley receives as much as 180 in. of annual rainfall, the Barber's Point area averages less than 20 in. This fortunate circumstance allowed most major processing units to dispense with various expensive weather tight buildings.

There are only three small enclosures in the whole plant in addition to the office building and

Please turn page



Dust collectors at every point in the new plant prevent the slightest air pollution. Raw mill at the right is completely air swept. An electrostatic precipitator (left) takes exhaust gases from the kiln



The builders of Hawaiian Cement Corp.'s new plant developed the "zone" or area system to speed design and construction

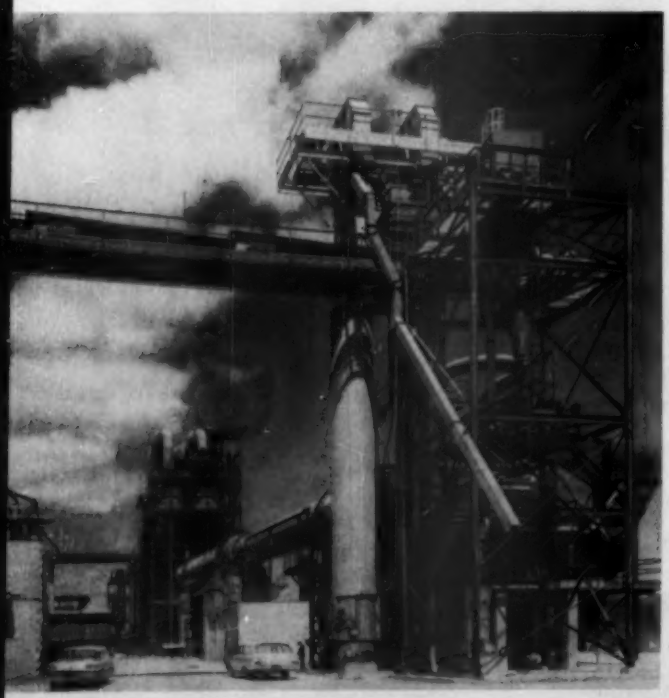
FROM AUSTERITY TO PROSPERITY . . .

continued from page 167

the packhouse. These are small concrete structures that house the kiln controls, the mill motor controls and the electrical substation. This open arrangement reduced equipment outlay and contributes to simpler maintenance procedures. Since all major pieces of processing equipment are easily accessible, it has been unnecessary to provide the usual overhead rail-mounted cranes. Instead, one 70-ton truck crane with a 150-ft. boom can handle all pieces of plant equipment.

The combination of straight-line material flow and the use of concrete silos for all material storage make the plant unusually compact. Actually it occupies less than half of the total 27-acre site. This compact arrangement made the plant far more acceptable to local building authorities and considerably simplified dust control.

Mainstay of the plant's material handling system is the bucket elevator. The system contains a total of 25 bucket elevators—probably a record for a 1-million bbl. installation. Dust is collected both at the boot and head of all elevators. Spare material handling equipment has been provided throughout the plant to avert a shutdown in case of a failure of any individual unit. There are only three belt conveyors—all located in the raw materials receiving and secondary crushing section.



Bucket elevators in circular casings are the hallmark of Riverside Cement Co.'s ingenious design engineers. Duplicate equipment throughout the plant assures continuous flow of material at all times

Coral limestone is the principle raw material for the plant. This material resembles limestone far more than it does conventional underseas coral formations. It is quite soft and tends to powder easily, so that no primary crushing is necessary. Although the 533-acre quarry is owned by Hawaiian Cement Corp., it is operated by the Inland Rock Co. under the terms of a recently negotiated contract. Basalt and trachyte, volcanic materials high in alumina, are purchased locally and delivered precrushed and sized. Silica sand is imported from Viet Nam and gypsum rock from Mexico. Almost all the sands available in the Islands are coral fines, and at present there is no commercial deposit of gypsum.

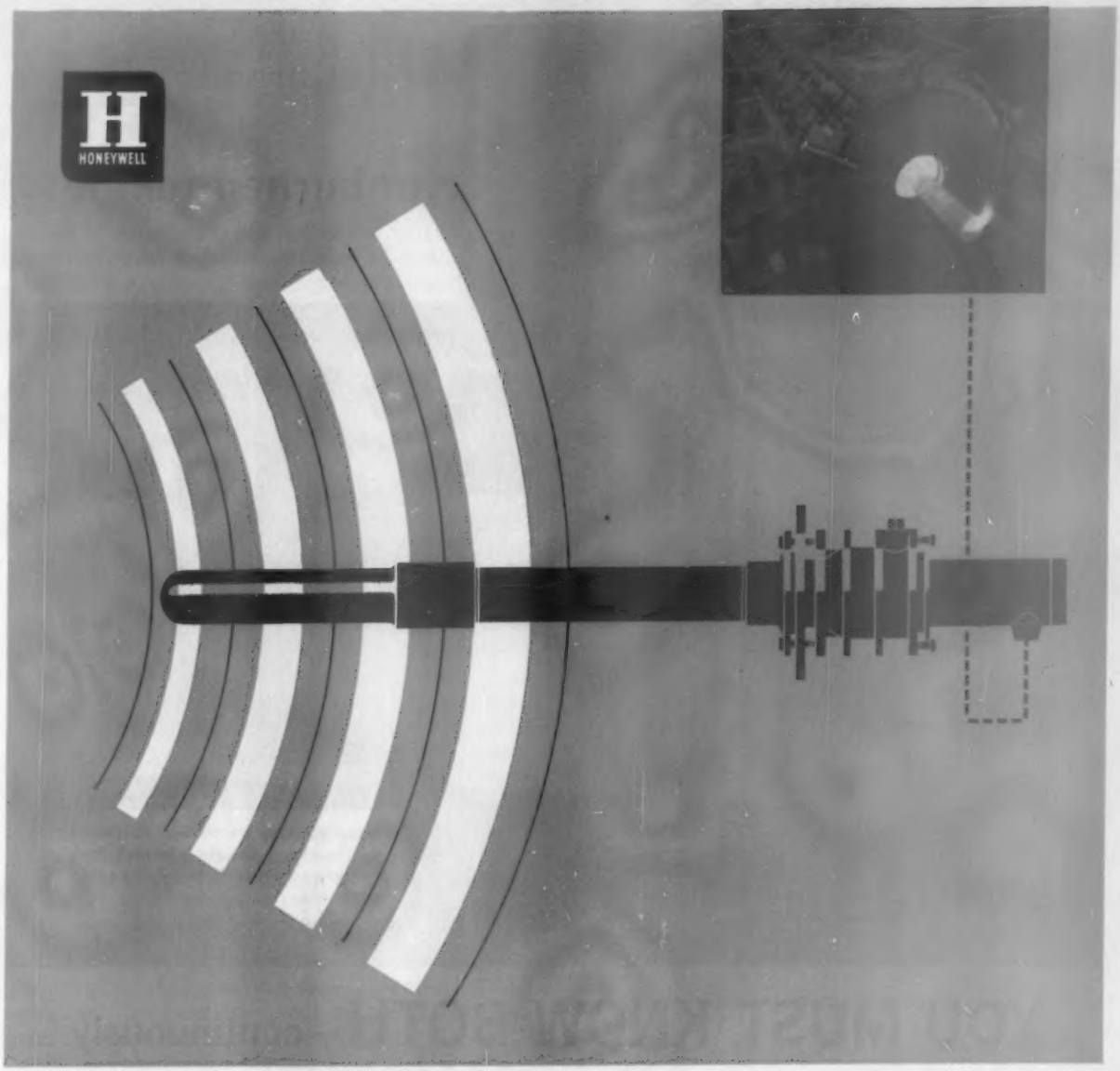
Raw materials are discharged into two 40-ton hoppers. Additives are conveyed to the boot of a bucket elevator which discharges to a belt conveyor distributing material between the three 5,280 cu. ft. silos provided for basalt, trachyte and gypsum, or delivering it to the boot of a second elevator for a second rise to the top of the larger, 97,830-cu. ft. capacity, silica sand silo.

Limestone goes from the receiving hopper to a 50 x 60-in. hammermill operating in open circuit, since, essentially, no plus $\frac{3}{8}$-in. material is contained in the plant feed. The same bucket elevators used to handle additives also transport limestone to storage in two 97,830-cu. ft. capacity concrete storage silos.

Feed for the raw mill is drawn from the storage silos by vibrating feeders and collected by a 30-in. belt conveyor. The conveyor discharges into the boot of a bucket elevator which deposits the feed on another belt conveyor feeding the 675-cu. ft. raw mill receiving hopper. A 36-in. weighing feeder meters feed to the mill itself.

Raw grinding is done by a 12 x 19-ft. ball mill supported on a single center tire and equipped with a trunnion drive. The mill is fully air swept and close circuited through a 16-ft. separator designed by the Riverside Cement Co. Rejects join the raw feed being metered to the mill, while ground material is sent to three 28,200 cu. ft. capacity homogenizing silos. The system permits either individual or combined grinding of the raw materials.

Please turn to page 171



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For more than 20 years, Radiamatic Infrared Systems have been giving reliable, accurate service in every area of industrial temperature measurement and control. Over the years, Honeywell has developed special infrared techniques and equipment for a wide range of applications, including soaking pits, kilns, heat treating, induction and forging furnaces.

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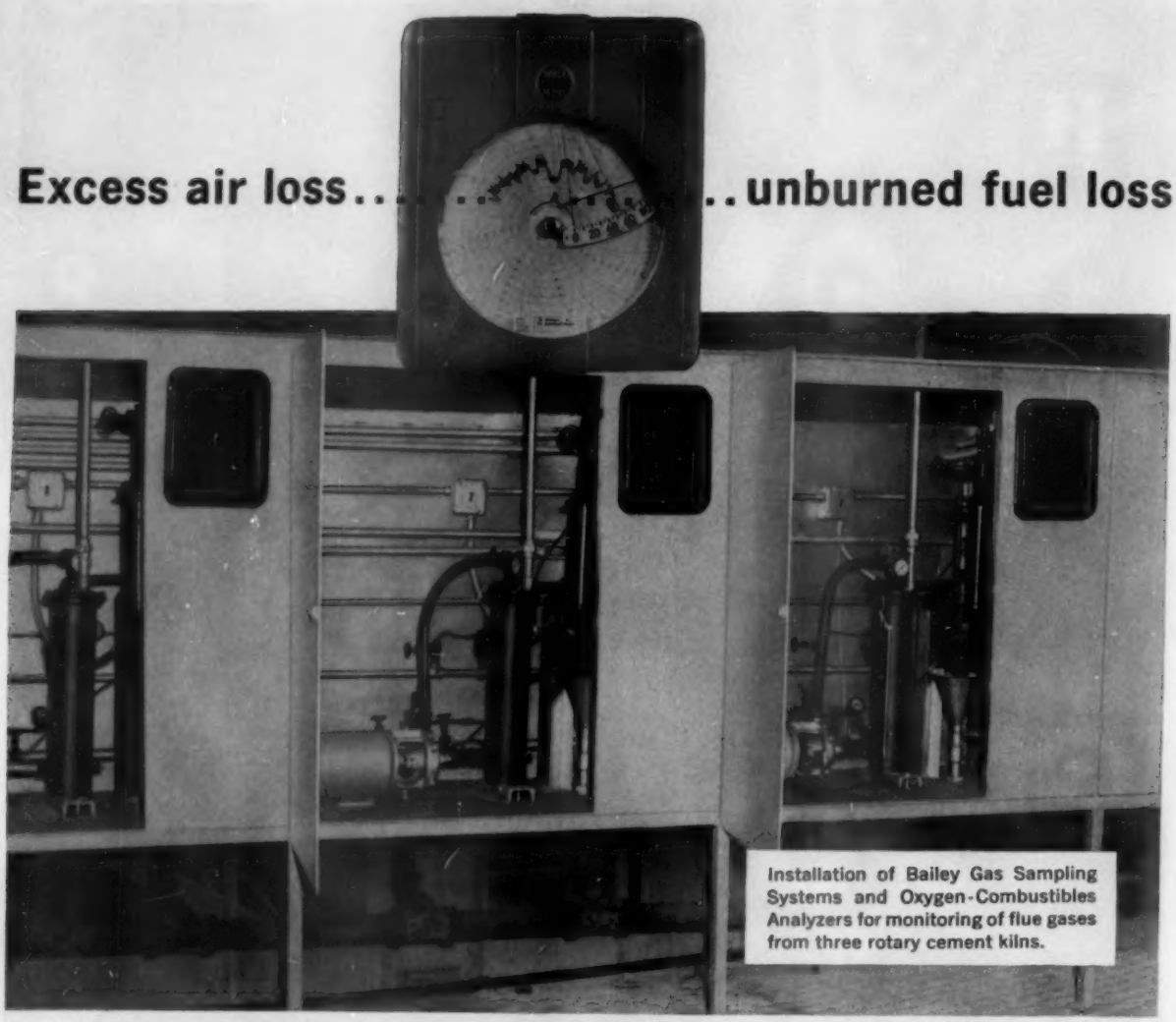

Installation of Bailey Gas Sampling Systems and Oxygen-Combustibles Analyzers for monitoring of flue gases from three rotary cement kilns.

YOU MUST KNOW BOTH – continuously

...to get best combustion efficiency with a rotary kiln

How much profit is going up the stack every day in unburned fuel? Or are unburned combustibles kept low at the price of heat loss from too much excess air?

Your flue gas tells the story. And the only practical way to know these losses and control them is by continuous analysis of flue gases.

The Bailey Oxygen-Combustibles Analyzer-Recorder performs this monitoring of both unburned fuel and excess air simultaneously and continuously, and records both on a single chart. It permits maximum combustion efficiency to be obtained by maintaining combustion air at the optimum point for each kiln. In addition to effecting savings in fuel costs—more and more important today—accurate control of combustibles helps to prevent ring formations on some kilns. Ask your Bailey engineer, or write, for complete details.

C160-1

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BAILEY METERS

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FROM AUSTERITY TO PROSPERITY . . .

continued from page 168

The finely ground dry raw materials are thoroughly mixed by aeration plates in the homogenizing silos before being fed to the kiln. Material is drawn from the homogenizing silos and delivered by a system of bucket elevators and screw conveyors to the 1,400-cu. ft. capacity kiln feed bin. A weighing belt feeder measures feed to the two parallel feed preheaters.

The 10 x 12 x 240-ft. oil fired kiln turns at 1 rpm. while a TV unit at the firing end of the kiln allows the burner to observe conditions deep within the kiln itself.

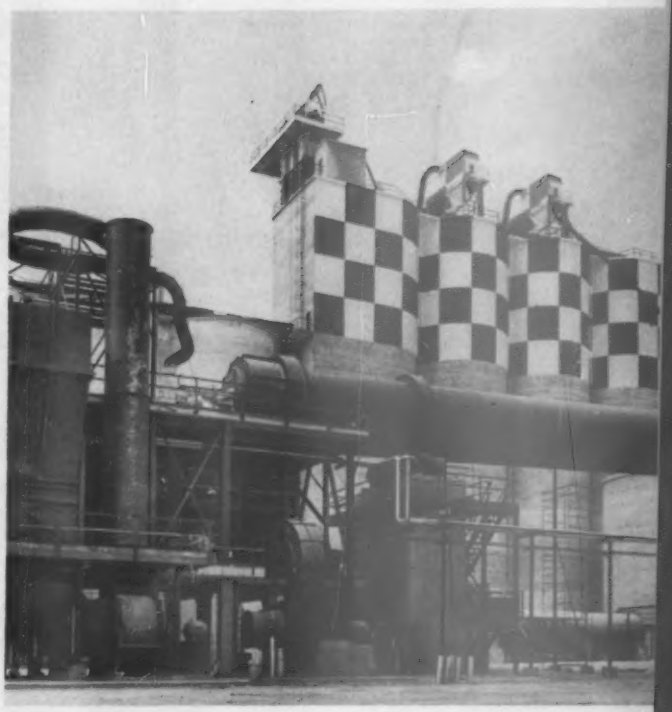
The television monitor itself is located in the air-conditioned kiln control room. Here the burner controls all conveying equipment bringing kiln feed from the homogenizing silos, and transporting clinker to storage. He can make whatever changes and adjustments in the flow of material are necessary to correct kiln conditions. A lighted flow diagram indicates all operating machinery.

Clinker is stored in two 97,830-cu. ft. concrete storage silos. These silos are located in the same group with the raw material silos. Clinker is drawn from storage by weighing belt feeders and conveyed by a system of bucket elevators and vibrating conveyors to the finish mill receiving hopper. A weigh belt feeder meters the clinker to the finish mill. The 12 x 19-ft. finish mill is a duplicate of the raw mill except that it is not air-swept and is served by a conventional separator.

Finish cement is stored in a group of eight 10,000-bbl. capacity storage silos. No rail facilities have been provided, so about 90 percent of the plant's output is shipped by bulk truck. Four 50,000-lb. overhead weigh hoppers have been provided for the two truck loading stations. Packaging facilities include a four-tube packer, and a three-section spring-type conveyor for handling the cement bags.

The use of a "zone" concept during design and construction helped speed construction. This involved formally dividing the plant into seven "zones." These were: raw material and crushing section; raw material storage; raw and finish milling; homogenizing and blending; kiln area; finish storage—bulk loading and packing—and office building. This formal separation allowed work to progress on each zone relatively independently.

Although the present plant capacity of 1 million bbl. is more than adequate for Hawaii's current needs, provision has been made to expand to an annual capacity of 3 million bbl. as future demand justifies it. **END**



These checkerboard markings on the raw material storage silos are the only local clues to the fact that Hawaii is an outpost of military defense

MAJOR EQUIPMENT REFERENCE

Hammermill, 50 x 60-in.	Hammermills, Inc.
Belt conveyors	Hewitt-Robins, Inc., Jeffrey Mfg. Co.
Conveyor belting	Hewitt-Robins, Inc.
Bucket elevators, (25)	Chain Belt Co.
Weighing feeders	Merrick Scale Mfg. Co.
Screw conveyors	Highland Machinery Co.
Vibrating conveyors	Jeffrey Mfg. Co.
Ball mills, 12 x 19-ft., (2)	F. L. Smidth & Co.
Mill reducers	F. L. Smidth & Co.
Kiln, 10 x 12 x 240-ft.	F. L. Smidth & Co.
Clinker crusher	F. L. Smidth & Co.
Clinker cooler	F. L. Smidth & Co.
Raw mill separator	Riverside Cement Co.
Finish mill separator	Raymond Div., Combustion Engr.
Kiln feed preheaters, (2)	Riverside Cement Co., by Highland Machinery Co.
Speed reducers	Western Gear Co.
Dust collectors, (20)	Micropulse Air Div., Mineral Products Inc.
Electrostatic precipitator	Western Precipitation Corp.
Weigh hoppers, 50,000 lb. (4)	The Howe Scale Co.
Packer, 4-tube	St. Regis Paper Co.
Yard crane, 70-ton, 150-ft. boom	P & H Harnischfeger Corp.
Fuel oil storage	Chicago Bridge & Iron Co.
Design	Bechtel Corp.
Construction	Hawaiian Dredging & Construction Co.

Readers may be surprised to see how the cement industry in this Far Eastern country is thriving

Taiwan cement producers forge ahead

by Albert S. Keshen

MARKETS GALORE, booming production techniques, and the financial and morale-boosting backing of the United States have built Taiwan (Formosa) into a figure of prominence in the cement producing world.

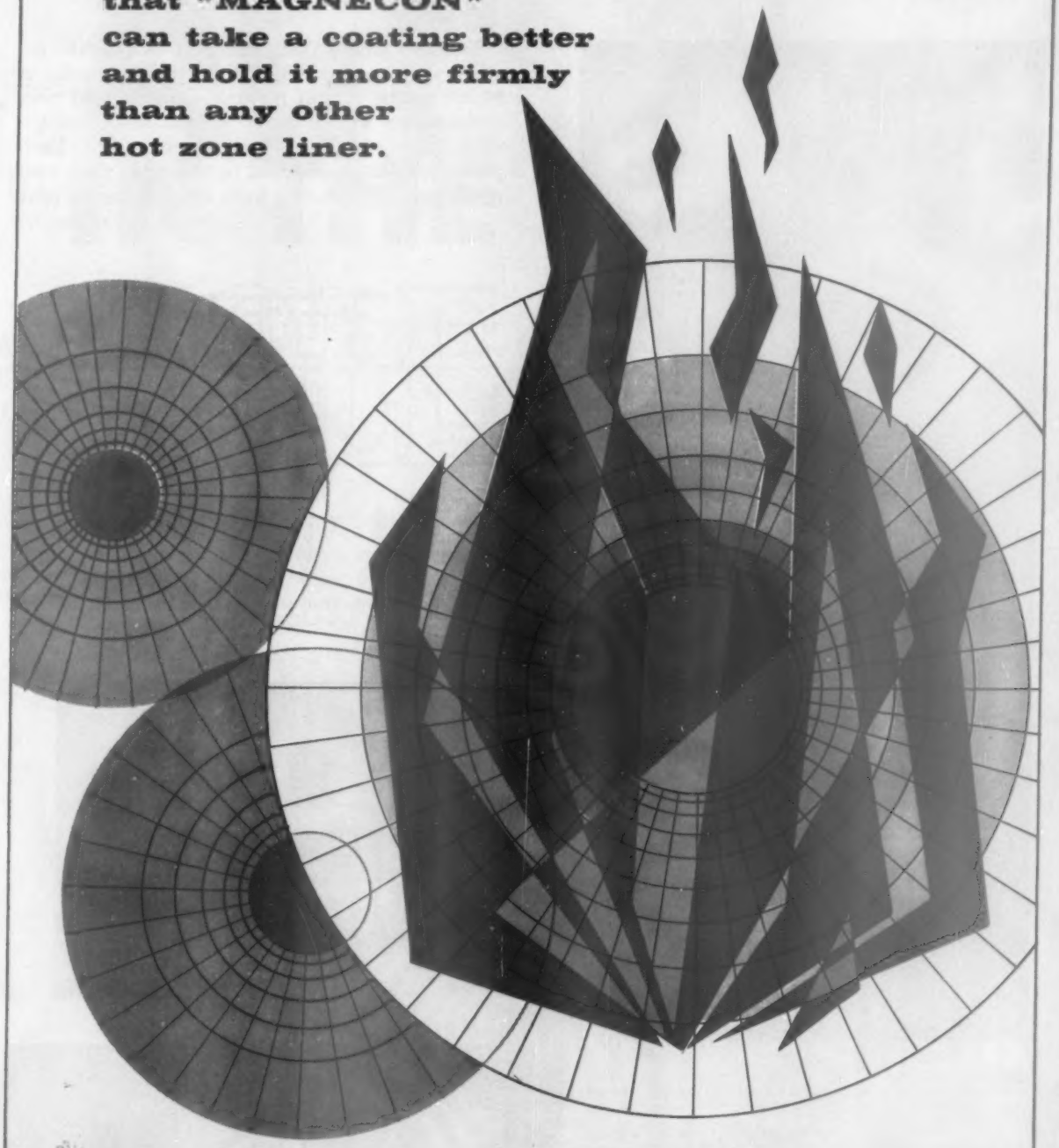
In the past 15 years, the island has become not only self-sufficient in providing cement, but the second only to Japan in Asia and the sixth largest exporter in the world! Portland, masonry, fly-ash and white cements flowed from some 10 major companies to the tune of a 1960 annual production of 1,200,000 metric tons. At present, the country boasts an assured annual 1961 production of over 1,427,000 metric tons, and 1962 will see a further increase by 300,000.

Free enterprise methods are behind the success of Taiwan industry. High defense and civilian administration outlays are maintained, as well as welfare policies that include a retirement plan, insurance, subsidies for school-age children, maternity care, social centers and housing developments. These benefits are amply reflected in the low production costs resulting from reduction in man-hour losses.

To get some idea of the annual production capacities of Taiwan's 10 major companies, take a look at Table I. *Please turn to page 174*

Left: One of the Far East's major cement producing plants —the Taiwan Cement Corp. plant at Kaohsiung

It has been demonstrated repeatedly that "MAGNECON" can take a coating better and hold it more firmly than any other hot zone liner.



CANADIAN REFRACTORIES LIMITED

CANADA CEMENT BUILDING, MONTREAL, CANADA

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TAIWAN CEMENT PRODUCERS . . .

continued from page 172

Above: Laboring in the limestone quarry near the Kaohsiung plant; this plant is the country's oldest and largest single source of cement

Above right: At the Suao plant, workers label and fill cement bags from packing machines

Right: Again at the Suao plant, workers load bags of cement on conveyor belt

Taiwan Cement Corp. has just established another plant in Hualien with a yearly capacity of 50,000 metric tons of masonry cement. Two more corporations were recently organized—Globe Cement Corp. and Tung Yang Cement Corp. Their plants are not yet situated, but together their 1962 production is estimated to be 300,000 metric tons.

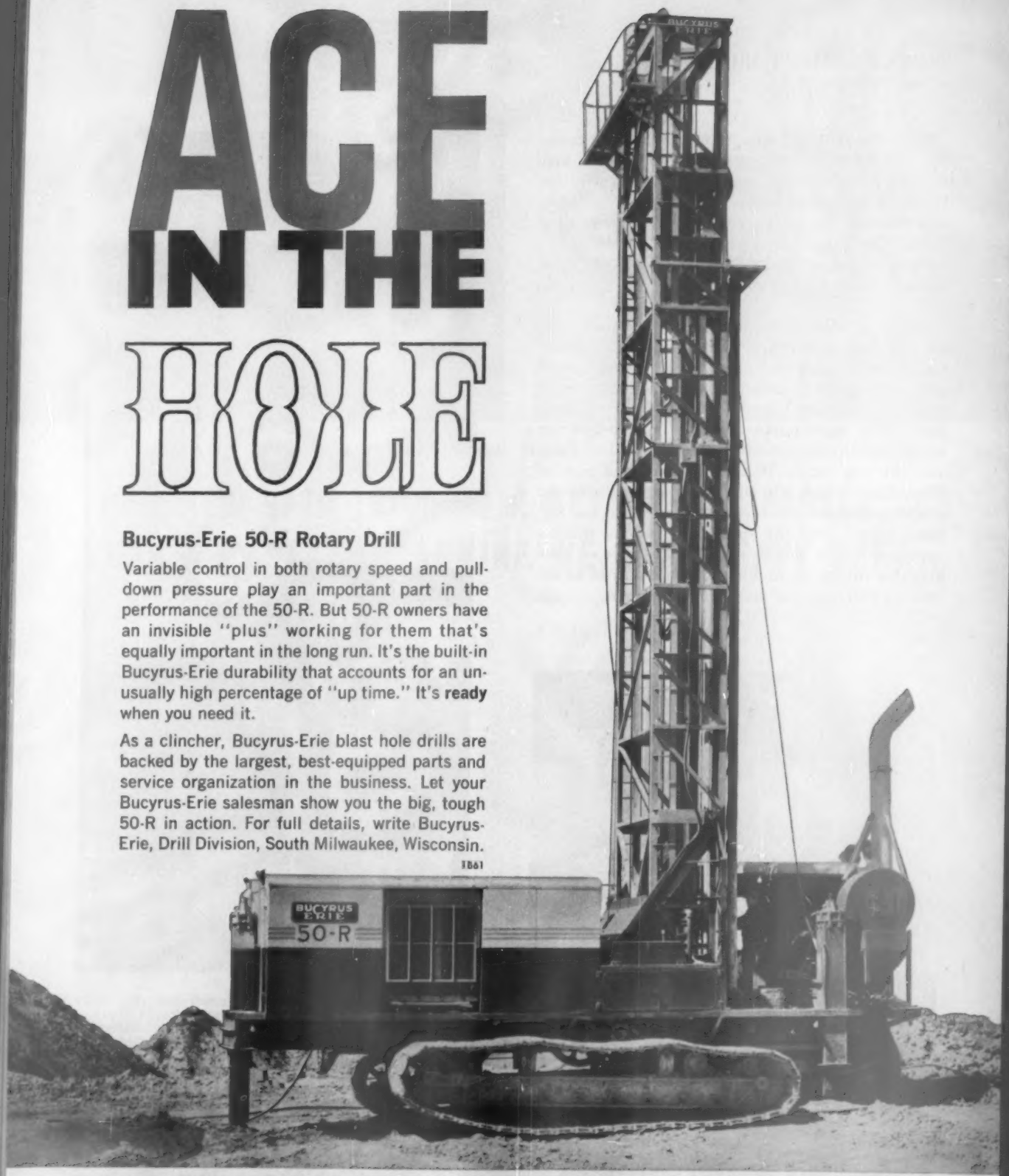
Please turn to page 176

Table I—Annual production capacities of Taiwan's 10 major companies

Plant	Annual output in metric tons (000)	Parent Company
Kachsiung	370	Taiwan Cement Corp.
Suao	220	
Chutung	210	
Kangshan	300	Chia Hsin Cement Corp.
Tatu	150	Asia Cement Corp.
Tsoying	80	Tung Nan Cement Corp.
Yangmei	14	Chi Shin Ent., Inc.
Ysoying	12	Shantung Synd. Ltd.
Fusin	10	Yung Kang Cement Corp.
Kweishan	10	Ewie Shan Ind. Corp.
Nangkan	10	Continental Engr. Corp.
Keelung	6	Tai Chang Ind. Corp.

Broken down into types of cement: portland, 972,000 metric tons; masonry, 210,000; fly-ash, 190,000; and white cement, 20,000

ACE IN THE HOLE



Bucyrus-Erie 50-R Rotary Drill

Variable control in both rotary speed and pull-down pressure play an important part in the performance of the 50-R. But 50-R owners have an invisible "plus" working for them that's equally important in the long run. It's the built-in Bucyrus-Erie durability that accounts for an unusually high percentage of "up time." It's **ready** when you need it.

As a clincher, Bucyrus-Erie blast hole drills are backed by the largest, best-equipped parts and service organization in the business. Let your Bucyrus-Erie salesman show you the big, tough 50-R in action. For full details, write Bucyrus-Erie, Drill Division, South Milwaukee, Wisconsin.

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most respected name in the field

TAIWAN CEMENT PRODUCERS . . .

continued from page 174

While the industry was in its infancy, the country was undergoing tremendous expansion and growth. Such gigantic projects as hydroelectric plants, dams, harbor repair and roadbuilding made it impossible for producers to meet all requirements. The Taiwan government was forced to import, spending annually the equivalent of three million United States dollars.

But now imports are a thing of the past, and cement exports are one of the country's largest sources of foreign exchange revenue. Just two of the many projects that will be swallowing huge amounts of cement are: (a) the Shimen Dam, part of a multi-purpose power and projection works and the largest of its kind in the Far East, and (b) the Tachia Dam, estimated at a cost of $20 million, which will put the Hoover Dam in the shade. Abundant and reasonable raw materials and labor supply, plus the steadily increasing market opportunities at home and abroad, foresee an even brighter future for an industry that should be advancing full blast for many years to come. END

Above: Masonry blocks of cement from the Suao plant are hand-trucked to storage yards. Taiwan Cement production is being directed to construction projects in which these blocks can be applied

Above left: Modern industrial buildings depend on these polished insulated slates, produced at Tai Chang's Keelung white plant now specializing in decorative concrete products

Left: Oxcarts carry cement ready for export down to the docks where it will be loaded on freighters bound to Free China's trade centers in the Orient

Report from Bishop Sand and Gravel Co.—Mitchellville, Iowa

"OUR NEW 977H IS DOING A BETTER AND FASTER JOB THAN ANY OTHER MACHINE WE COULD HAVE USED...

"One of the reasons we get such good production is the power shift transmission. I think it's one of the best improvements ever put on a machine."
I. J. Bishop, Owner

The Bishop Company produces 1000 tons of sand and gravel a day. Their 977H excavates the gravel, feeds the screening plant and loads trucks. Occasionally, it's used for building levees, stripping overburden and general utility jobs.

This new 977H Traxcavator is a 2½ yd., 150 HP, tough, reliable machine that can handle about any excavation-loading job that comes along. It's designed to set a faster production pace than the model it replaces (and other makes of comparable size). With power shift transmission and live action hydraulics, it's the Traxcavator that never stops. It can take the roughest kind of work in stone quarries and gravel pits—move as much as 3 to 4 thousand tons a day.

Also built for tough pit and quarry work is the 955H—a 100 HP machine with 1¾ cu. yd. bucket and the same advanced features as the larger 977H.

Why not call your Caterpillar Dealer and arrange a demonstration? Put these machines against those you are now using and watch the difference.

NEW POWER SHIFT TRANSMISSION—one lever gives split-second changes in speed or direction to slash cycle time.

NEW LIVE ACTION HYDRAULICS provide faster lifting speed and greater lifting capacity without robbing power from tracks. The 977H packs 41% more hydraulic lifting force—955H, 37% more than former models.

NEW HEAVY-DUTY UNDERCARRIAGE has big D7 size track components, triple grouser shoes, lifetime lubricated rollers that need no servicing until rebuilding. Track guiding guards are welded to the roller frame for positive track alignment.

NEW DRY-TYPE AIR CLEANER removes 99.8% of all dirt from intake air even in worst dust conditions—cuts maintenance time as much as 75%.

Caterpillar Tractor Co., General Offices, Peoria, Ill., U.S.A.

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TRAXCAVATORS ARE MAKING OTHER LOADERS OBSOLETE

DEWEY AND ALMY RESEARCH NOW BRINGS YOU A NEW WAY TO MEASURE MILL RETENTION TIME...

Photo shows new Dewey and Almy portable testing kit designed to measure Mill Retention Time (M.R.T.) in your plant. Test is based on newly-developed Dewey and Almy technique for "tagging" particles with a fluorescent material and identifying them in the grinding mill discharge with a Coleman Fluorometer. Instrument's unique sensitivity detects one part of fluorescein in 100 million parts of cement. Latest development of our Rock Products Chemicals team, this new test technique is another important example of how Dewey and Almy serves the industry's needs through fundamental research in dry dispersion and other related fields.

. . . . (M.R.T.)*

**The time required for an average sized particle of clinker to be produced in one pass through the grinding mill.*

By pointing the way to increased grinding efficiency and quality control, a true measure of Mill Retention Time (M.R.T.) can make an important difference in your profit margin. To give you an accurate, on-the-spot check of your M.R.T., Dewey and Almy research has recently perfected the important new "fluorescein tagging" technique detailed at left. With no cost or obligation to you, we'll be glad to send a trained technician from our Rock Products Chemicals team to run this revealing test at your plant. On the basis of the results, he will work with you in suggesting mill adjustments to help you obtain optimum clinker/cement ratio, optimum circulating load and optimum grinding time/hour. He will also suggest proper use of Dewey and Almy dry dispersion grinding aids to help increase air separator efficiency and improve quality through better control of particle size distribution. Your letter or phone call will bring our technical man.

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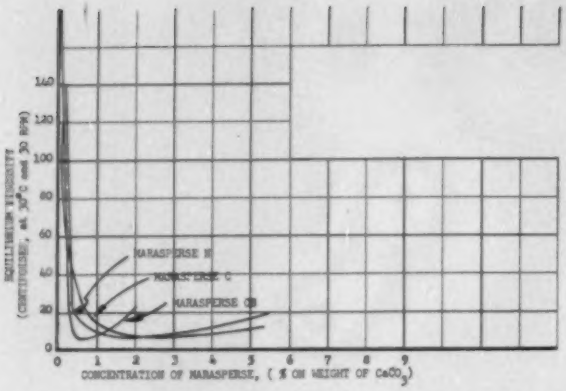
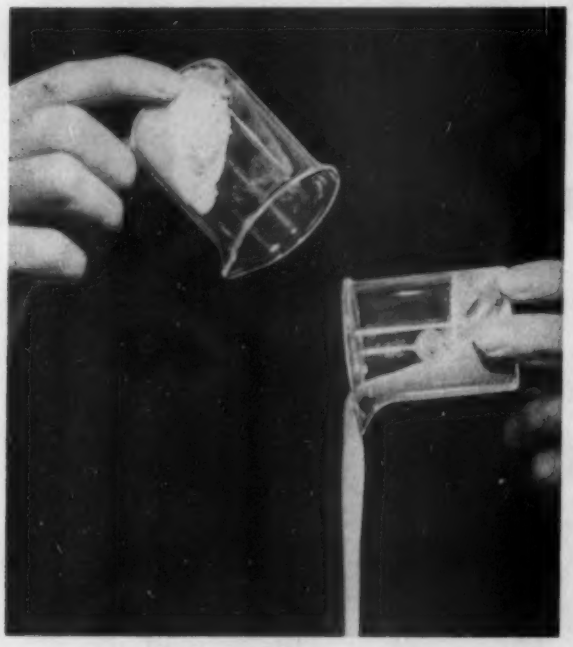
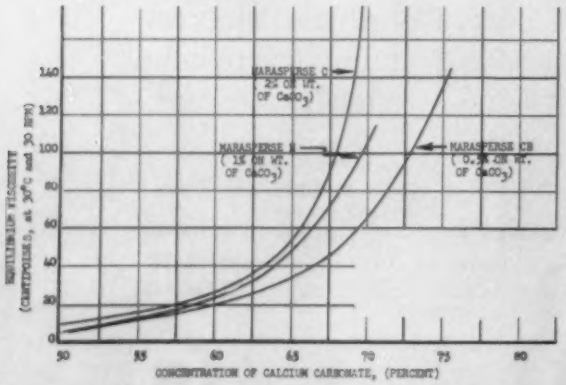


EFFECT OF MARASPERSE CONCENTRATION on viscosity of a 50-percent calcium carbonate slurry



HERE'S GRAPHIC EVIDENCE of how a dispersion agent reduced the viscosity of a limestone slurry. A dose of ¼ of 1 percent Orzan S decreased the viscosity about 95 percent


MARASPERSE C (2% ON WT. OF $CaCO_3$)
MARASPERSE N (1% ON WT. OF $CaCO_3$)
MARASPERSE CB (0.5% ON WT. OF $CaCO_3$)
CONCENTRATION OF CALCIUM CARBONATE, (PERCENT)

EFFECT OF CALCIUM CARBONATE CONCENTRATION on viscosity of dispersions made with Marasperse

These by-products of the chemical industry solve some of rock products producers' toughest problems

What do you know about dispersion agents?

by Walter B. Lenhart

DISPERSION AGENTS are finding more uses in the rock products industry. They are almost essential for the industries that use many of the finished products of our industry. Thus, dispersion agents find very wide use in the bituminous concrete business—as emulsifying agents, detergents and stabilizers. They are used in refractory brick formation, foundry cores, lime and limestone slurries, gypsum wallboard formation and for ball mill operation. In addition, these powerful chemicals are used for water treatment, boiler water dosing, road stabilization and many more applications too numerous to mention.

What is a dispersion agent? It's a chemical of the class called "surface active agents" that possesses, to some degree, the property of dispersing colloids or other solids in suspension; wetting, by reducing the surface tension of water and the interfacial tension between water and another surface; foaming; emulsification, and detergence. Not all dispersion agents have the same degree of these characteristics; it depends on the ratio of hydrophobic and hydrophobic constituents.

In one respect, these reagents are the opposite of flocculating agents. They overcome the cohesive forces between individual particles. As the chemicals come in contact with particles of a suspension, a negative charge is imparted to each particle. As like signs repel, the net effect is to

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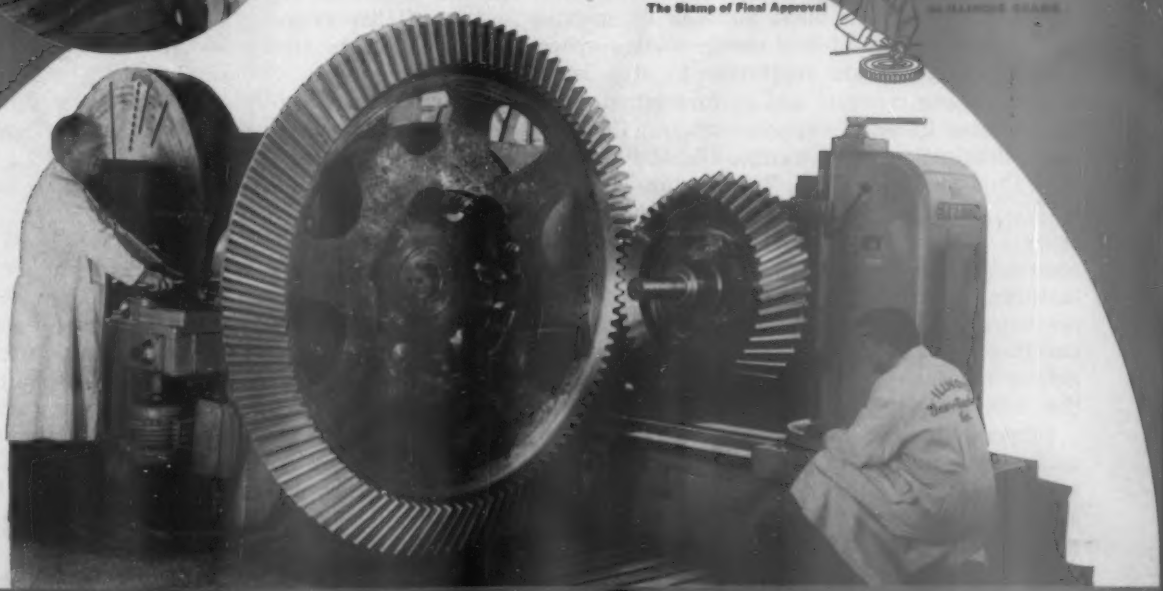

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DISPERSION AGENTS

continued from page 180

retard, or even prevent, some solids from settling in water suspensions.

In a practical application, if one has a sand that defies the removal of a clay coating, a dispersion agent might be helpful. However, if stream pollution is not tolerated, the non-settling characteristics of the wash water must be considered. If stream pollution is a hazard, the use of a flocculating agent may then be necessary to recombine the nonsettling fines into larger flocs so they will more readily settle out. Cost of the two chemicals may be a factor except under certain circumstances, for instance, where the freight on a good sand may be so high that the added cost of chemically treating the sand with a dispersion agent, followed by flocculation, may be warranted.

Sodium silicate is one of the better known dispersing agents. Its use in the froth flotation process is almost universal. A less well-known use is as a wet sand stabilizer. Sodium silicate and calcium chloride are separately and simultaneously injected into a bed or seam of wet sand by suitable tubes. The two chemicals then react to form a silica jell that congeals and solidifies the sand. Strengths as high as 900 psi. compression have been obtained by this process. A sand solidification process was used under the kiln, ball mill and silos of a portland cement plant built on fill ground. The process has also found use in mining operations—in dirt-fill dam treatment to stop leaks, to seal leaking concrete and in foundation work. The process is being exploited by the Chemical Soil Solidification Co., Chicago, Ill., and the Calcium Chloride Association, Washington, D. C.

It is advisable for anyone who contemplates using a dispersion agent in the plant that technical advice be obtained direct from the manufacturer. Because of the great number of dispersion agents, the variation in their properties and the wide range of cost, a skilled technician's help is imperative. This insures a dispersion agent that will do a specific job at the lowest cost.

Dispersants and surface wetting agents find such widespread use in the organic field that some manufacturers of dispersants devote their entire sales and research efforts to that area. But it is also possible that some manufacturers do not have a full knowledge of the potential applications. Their literature concerns itself with tabulations, showing the material's properties, rather than its specific applications. This, in turn, indicates that a particular field may need further exploration; the rock products industry is probably one of them.

By-products from large basic industries is a prolific source of dispersion agents. The nonfibrous portion of wood pulp is a major source. There seems to be no shortage of suppliers of dispersion agents. Practically all the manufacturers of heavy chemicals, soaps, paper and many others, offer a wide range of dispersion agents. These find so many and growing uses in practically all types of industry that a brief review is in order.

American Cyanamid Co. probably leads the field in the sale, application, servicing and related functions where dispersants are applicable. The company's surface active agents, the "Aerosols" are too well-known to need elaboration. The company, with its large research laboratory in Connecticut, has introduced dispersion agents very widely in the froth flotation field.

One of its less well-known dispersants is "Aerospray 52," a binder. It has been used as a spray to prevent dust losses when fine industrial sand was shipped in open-top cars. It also will help prevent dust losses in stockpiled material. If piles of tailings or rejects from a plant are a problem, spraying with Aerospray 52 may help.

This company also has a soil solidification process. These processes come under the general heading of Dispersion-Floccultation. Cyanamid's process uses a chemical known as "AM-9" and consists of two organic chemicals and a catalyst. Wet ground is necessary for satisfactory results. Service organizations such as the Chemjet Corp., Hollywood, Calif., and Franki of Canada, Ltd., Toronto, Ont., are available to preform the applications.

The Crown Zellerbach Corp., Chemical Products Div., Camas, Wash., has a group of chemicals with dispersion properties. These are called "Orzans," and find use as flotation reagents, emulsifiers, emulsion stabilizers, water treatment and in adhesives. Specific applications are as asphalt emulsifiers, as an ingredient in refractories (bricks and furnace linings), foundry cores, clay, lime or limestone slurries.

Orzans are said to prevent coating of ball and tube mill grinding charges, thereby giving a better contact between the material ground and the grinding media. By stripping off the coatings from steel balls, the grinding effect is greatly improved. Dilute solutions of Orzans, sprinkled on road beds, stabilize the bed for asphalt paving. In the gypsum wallboard field, lower the amount of water needed

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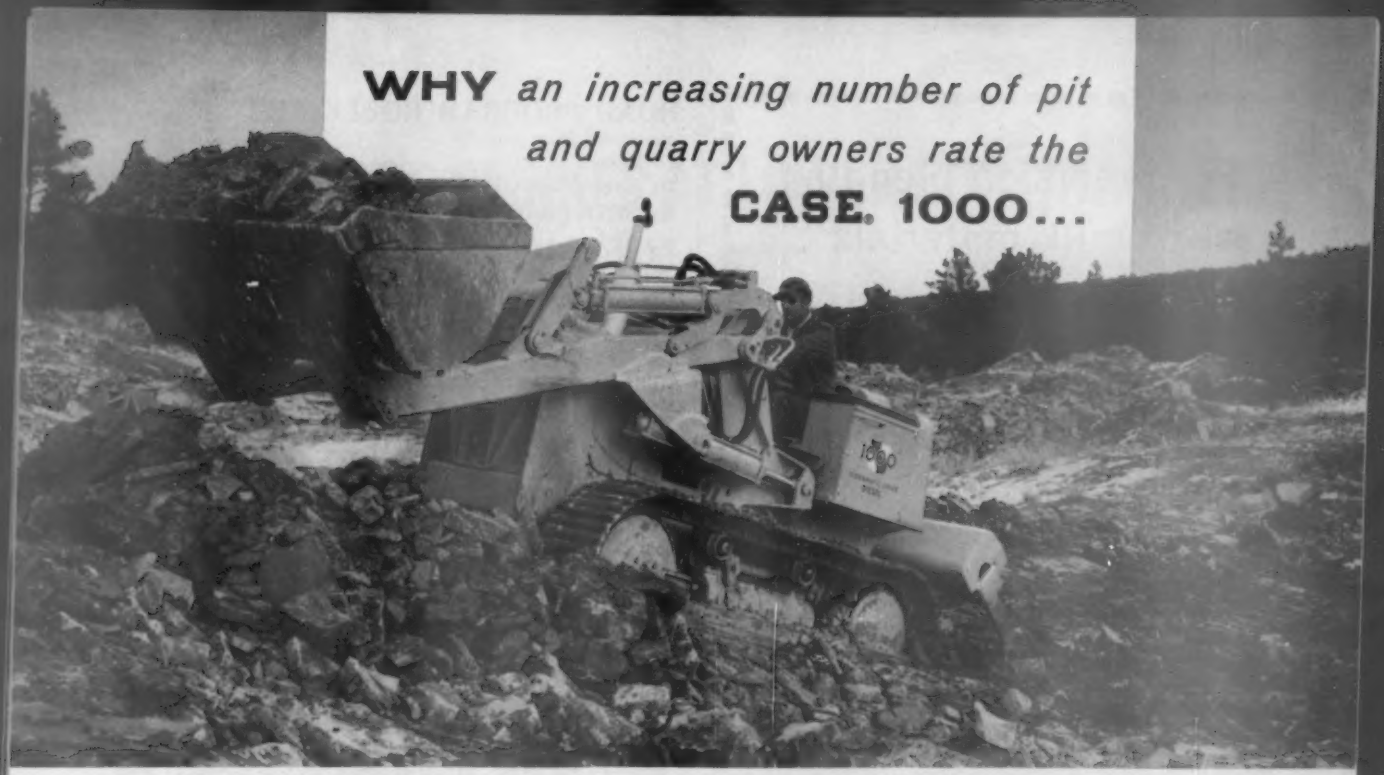

WHY *an increasing number of pit and quarry owners rate the* **CASE 1000...**

"BEST RIG FOR ITS SIZE AND PRICE WE'VE EVER FOUND FOR OUR WORK"

Note how the 1000's heavy-duty 3-tooth hydraulic ripper penetrates and breaks up hardpan, to facilitate loading with tractor-shovel bucket.

In this rugged mountain country, a 2 cu yd Case 1000 tractor-shovel is ripping off thick layers of clay and rock overburden, to uncover valuable "pay stone." Grades, in many cases, are *steep, slippery, treacherous!* Loads are heavy, wear on crawler tracks — murderous!

Yet, according to the owner, the Case 1000 is *"performing beyond expectations, under conditions where no other crawler could work satisfactorily."* The owner states further, "The 1000 is better balanced... handles easier, more safely, with a full load than other crawlers do empty."

There are, of course, logical reasons for this superior performance. (1) The Case 1000 is equipped with a hydraulic torque converter that increases or decreases push-pull power instantly, AUTOMATICALLY, to match changes in load. You get up to 25,400 lbs push-pull power — without *clutching, shifting, or stalling.* (2) Exclusive Case torsion track suspension also gives you *greatly increased traction* — especially on irregular terrain. (3) Counter-rotating Terramatic® Transmission lets operator change speeds or reverse direction *on-the-go* with the flick of a wrist... spin-turn "on a dime" with full power on both tracks, for extra-fast dig-load-dump cycles.

Best of all, comparative field records prove the Case 1000's heavy-duty track system will handle *50% more production than ordinary tracks* before needing replacement. Try a 1000 tractor-shovel or dozer on *your* job. See why other operators rate it "the best rig for its size and price" in the entire crawler field. For name of nearest dealer write J. I. Case Co., Dept E1471, Racine, Wis.

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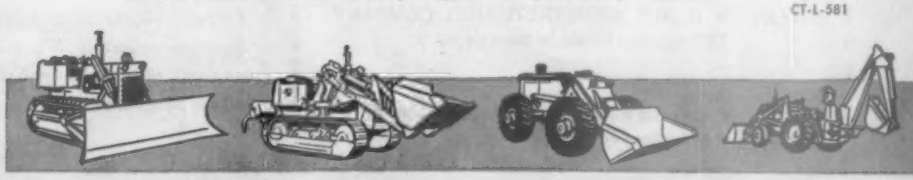

THE ADVANCE-DESIGN TRACTOR LINE... 13 MODELS... OVER 50 EQUIPMENT COMBINATIONS

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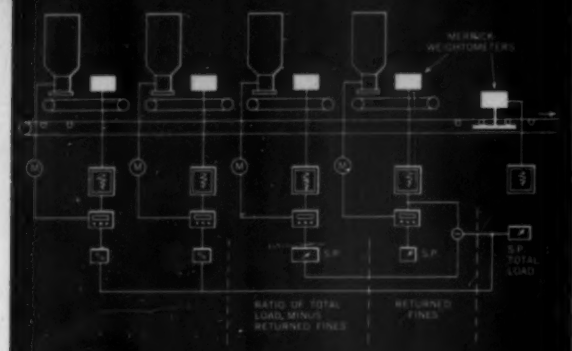
AUTOMATICALLY...

Here's how Weightometers can automate a typical blending system . . .



Loading is made at the set-point station, which imposes an output voltage signal to all ingredient control stations. All materials are controlled to a percent of the total load required. Recoverable material set-point is determined by returned product available. Feed is controlled by difference of returned material and total load of master set-point.

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not only weigh and record the amount of material passing along a conveyor, they can be used to automate complete production systems. The blending system diagrammed above is typical. Integrating and recording arrangements can be electronic, mechanical or electro-mechanical.

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ROAD PROGRAM ROULETTE . . .

continued from page 99

an experimental highway section known as the AASHO Road Test, near Ottawa, Ill. Planning started in 1952, and construction of the 836 test sections began in 1956. Eight miles of construction were completed and test traffic began to flow in the Fall of 1958.

Construction controls on the five loops of test road were more strict than any ever before attempted in large-scale highway operations. These controls required rigid inspection and assembly-line testing procedures to assure test sections of uniform quality.

Portland cement concrete test sections ranged from 2½ to 12½ in. thick on subbases ranging from 0 to 9 in. Asphaltic concrete test sections ranged from 1 to 6 in. thick on base, and subbase courses between zero and 25 in. A fleet of 60 test trucks—ranging from 2,000 lb. for single rear-axle loads, to 48,000 lb. for tandem axles—began trundling over these test sections on November 5, 1958. Test traffic was finally terminated on November 30, 1960, after accomplishing some 17 million miles of travel and accumulating about 1.1 million load applications on each of the test lanes.

There are no results as yet. Instead, the BPR tells us that over 200 million individual items of data will be fed through electronic computers and other data-processing equipment which will obligingly disgorge information. This the BPR will use to make size and weight recommendations. A final report is expected in June.

Any estimate of what this report will say would be pure conjecture. It is rumored that the portland cement people are delighted over the performance of concrete test sections. It is also rumored that the trucking people are not going to be pleased with the ultimate recommendations. But even BPR officials profess no opinion until the data are fully assembled and evaluated.

One of them told me: "Researchers will have a field day for the next 10 years with the information turned up in this study. If legislation follows the limitations we suggest, then future Federal aid probably will be tied to conformity to sizes and weights recommendations coming out of this AASHO Road Test."

The ball has now been passed to Congress. It must call the play from here on. The immediate fate of the Interstate Highway System depends directly on how quickly and how effectively Congress acts on the mass of information so recently supplied to it by the Bureau of Public Roads.

Editor's Note: Next month we will take a look at the highway scandals. We will make an effort to assess them and put them in a realistic perspective in relation to the whole program.

GRIND MORE CLINKER AT LOWER COST/BARREL

by installing Pennsylvania Fine-Reduction Reversible Impactor ahead of finishing mills

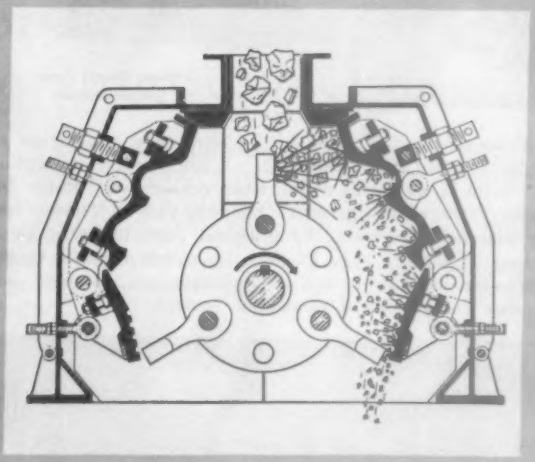
Pennsylvania 5-38 Fine-Reduction Reversible Impactor occupies less than 18 sq. ft. of floor space. Note in cross-section drawing, the multiple action impact crushing of a Pennsylvania Fine-Reduction Reversible Impactor.

Pennsylvania Fine-Reduction Impactors producing fines for feed to finishing mills can increase clinker grinding capacity by as much as 35 percent. Existing installations in cement plants prove the value of compact Fine-Reduction Impactors to precrush clinker . . . effect large economies in the grinding operation.

In a single pass through the Impactor, clinker is exposed to multiple action impact crushing as it ricochets back and forth between whirling hammers and adjustable breaker blocks. This multiple action crushing by impact produces a maximum of fines. The finer the feed to the finishing mills, the less work to grind the clinker to correct size. Also, grinding balls can be smaller in size to glean additional grinding capacity from existing mills.

The multiple crushing action of Pennsylvania Fine-Reduction Reversible Impactors is also a real profit-making factor in tertiary crushing of limestone and cement rock. This low-cost, sturdy crusher with its multiple action impact crushing raises the percentage of fines to the raw grinding department. With a finer feed, the raw grinding mills can handle as much as one-third more tonnage without a heavy investment in additional grinding mills or other raw processing accessories.

The compact Pennsylvania Fine-Reduction Impactor, occupying a minimum amount of space between the existing secondary crusher and the raw grinding mills, is the best way to obtain more capacity from existing equipment within a tight, new-equipment budget.



LET A TEST RUN PROVE IT!

Pennsylvania Crusher's extensive laboratories in West Chester are available to you at no obligation to determine if *your* raw and clinker grinding capacity can be increased to the degree enjoyed by other cement plants.

Your Pennsylvania Engineer will be glad to discuss Fine-Reduction Reversible Impactors with you . . . or write for free bulletin.

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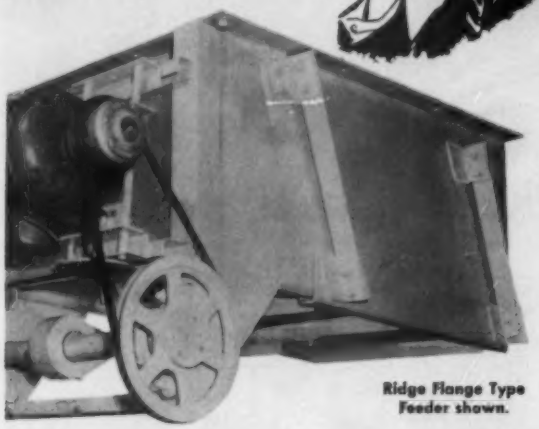

Ridge Flange Type Feeder shown.

Split-second feeding control . . . continuous production of cinder, crushed stone, sand, etc. . . . low power consumption . . . little or no maintenance. Good reasons why Ridge Vibrator Feeders boost materials handling profits. Reasons too! for you to investigate the practical advantages of these Flange or Hopper Type Feeders. In models from 20 to 200 tph capacities with welded steel construction, balanced suspension and simplified volumetric control.

Ridge Feeders combine efficiency with economy for compact hopper installations.

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DISPERSION AGENTS

continued from page 182

to get the desired consistency for wet board mix. This increases dryer capacity.

The Marathon Corp., Chemical Sales Div., Rothschild, Wis., has a group of dispersants called "Marasperse." Their properties permit their use for waterproofing concrete, for road stabilization and other uses. Marasperse emulsions can be used to modify the setting time and strength of portland cement concretes where lightweight concrete is desired. They achieve a reduction in viscosity of limestone slurries as shown in the graphs.

Armour Co., Armour Chemical Div., 1355 W. 31st St., Chicago 9, Ill., has a line of surface active agents that are marketed under the name of "Ethomeens," "Ethoduomeens," "Ethomids" and "Ethofats."

The Hercules Powder Co. markets "Rosin Amine D" that finds many uses as a surface active agent, corrosion inhibitor and other uses. "Rada-Polyrad" is a derivative and finds similar uses. END

CEMENT IMPORTS . . .

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and a surprisingly large quantity of cement from foreign sources entered the New York City area (224,000 bbl.) and the general Philadelphia area, including Trenton (190,000 bbl.). Imports were insignificant along the Gulf and Pacific coasts and in all the Great Lakes region except at Rochester. As anticipated, the cement plant at Clarkson, Ont. (target of an unsuccessful anti-dumping investigation a year ago) shipped no cement to Chicago in 1960.

Imports of white cement were at an abnormally high level in the first half of 1960, when 178,000 bbl. entered, but were sharply lower thereafter, so that the quantity for the year was 280,600 bbl. compared with 280,400 bbl. in 1959. In 1960 white cement was imported from 8 countries. Belgium maintained its position as the principal supplier, with 99,400 bbl.

Imports of white cement from Japan continued to increase sharply; in 1960 imports from that country were 10 times larger than in 1958. Japan

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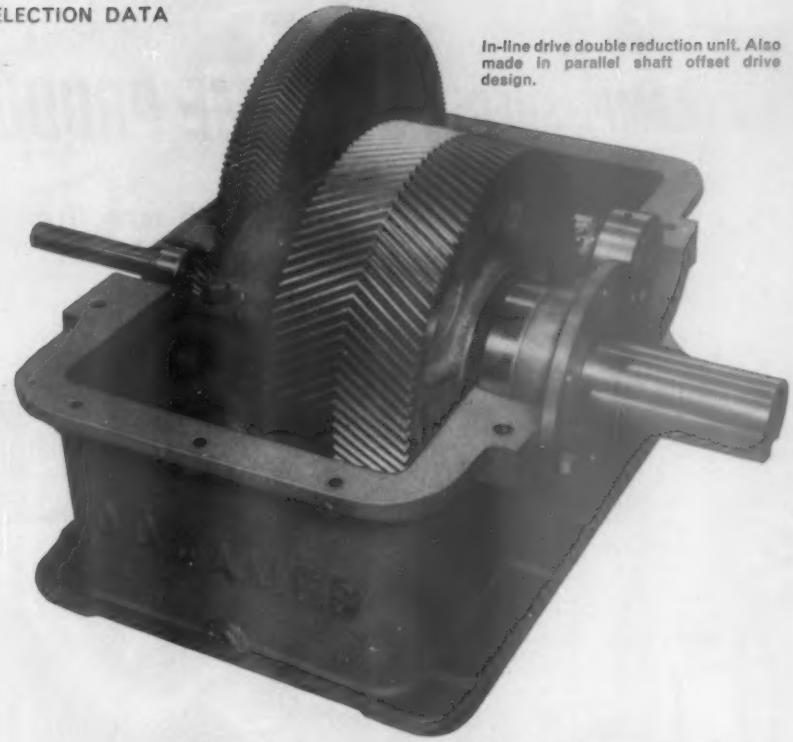
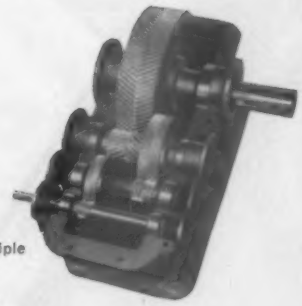
D. O. JAMES SPEED REDUCER SELECTION DATA



In-line drive double reduction unit. Also made in parallel shaft offset drive design.

for heavy loads, use herringbone reducers



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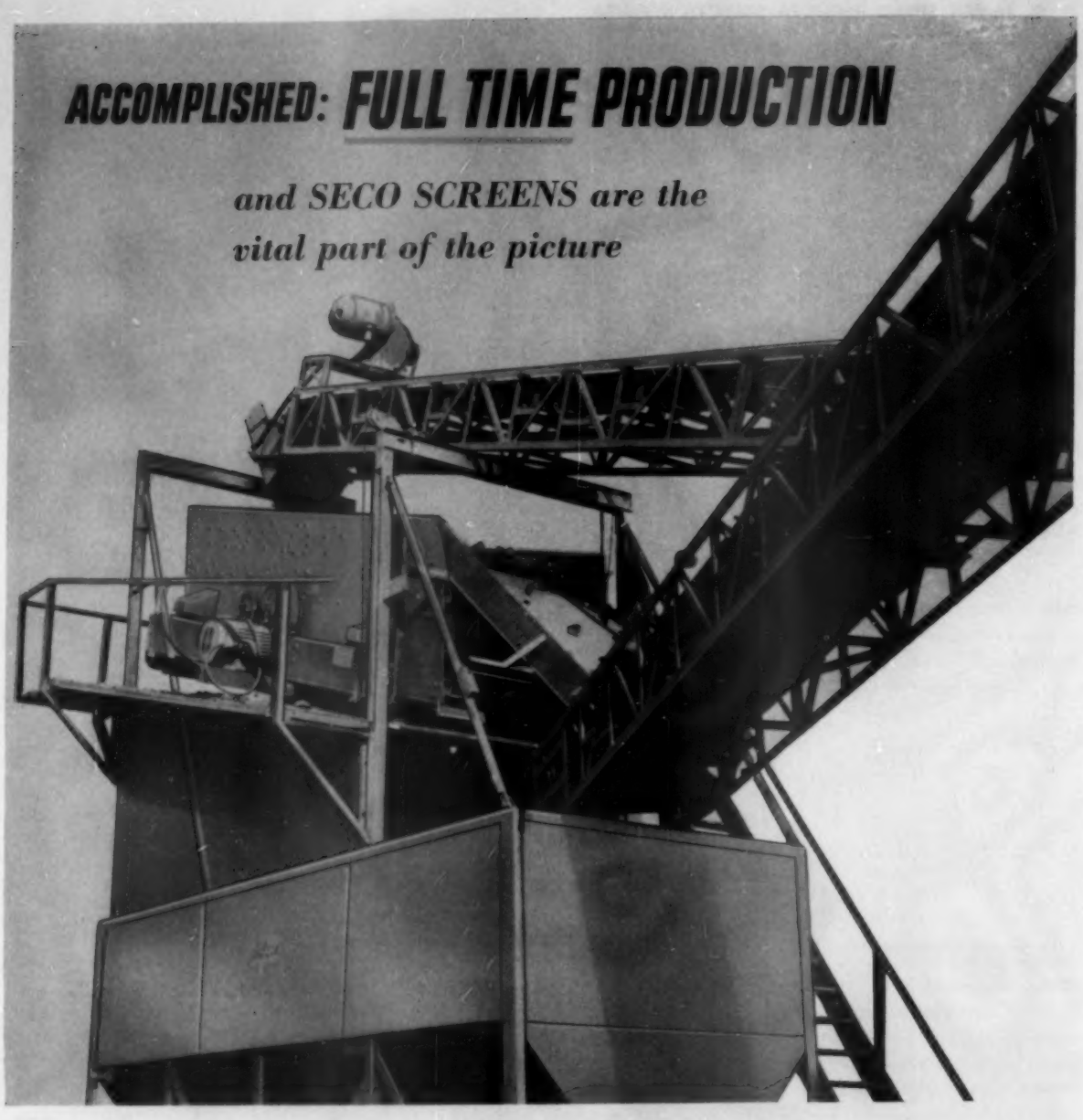

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CEMENT IMPORTS . . .

continued from page 186

was the third largest supplier in 1960 compared with fifth in 1959 and seventh in 1958. Imports of white cement from France and Mexico continued to rise, whereas supplies from Denmark, United Kingdom and West Germany showed marked declines.

Florida was again the major user of foreign white cement, taking 182,100 bbl., of which 91,500 bbl. originated in Belgium, 49,800 bbl. in France, and 20,800 bbl. in Japan. As in the preceding year, the only other Customs districts importing sizable quantities of white cements were Puerto Rico (35,800 bbl.) and Los Angeles (26,600 bbl.).

Hydraulic cement clinker imports were again virtually nil. Although published official statistics in the first half of 1960 show imports of clinker, corrections made later indicate that in reality little if any was imported. One of those corrections shows that a 26,600 bbl. shipment from Belgium into Connecticut in February was instead standard portland cement. **END**

MECHANIZATION PAYS . . .

continued from page 136

jaw crusher has been purchased recently for production of base-course crusher run.

Total horsepower approaches the 2,000 mark. Electricity is supplied by the Durban Municipal Power Station for all equipment, except for the portable diesel power plants.

Delivery of two-thirds of the daily sales is made by road. Coedmore's own fleet consists of 12, 12-cu. yd. diesel lorries. Their products are also railed to practically every part of the Province of Natal. A large proportion of this Province's demand is met by Coedmore Quarries.

The firm is a division of Natal Portland Co., Ltd. and also associated with Anglo Alpha Cement, Ltd., as well as the Anglo Transvaal Consolidated Investment Co., Ltd. group.

Begun 35 years ago under different ownership, the plant's early demand was for ballast stone used by the South African Railways. With expansion and growth in the Province and the City of Durban, a considerable market for concrete stone has developed, and an increasing amount needed for construction of hard-surfaced roads. **END**

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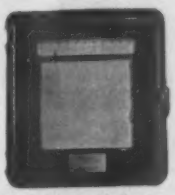

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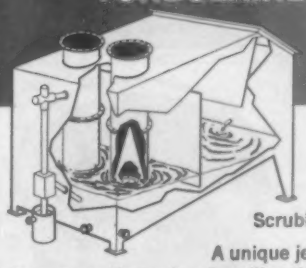

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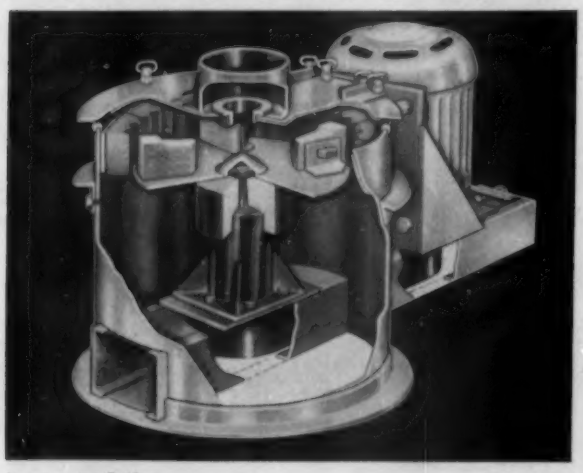

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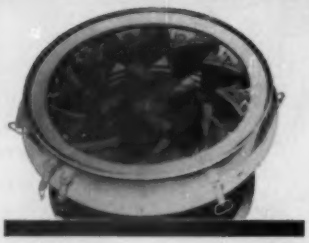

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ROCKY'S NOTES

continued from page 24

the form of SiO_2 or as a silicate is seldom lacking in any soil, except peaty kinds, but it is obviously not a detriment to agricultural limestone, especially if there are traces of the rarer elements in the silicates. In heavy soils used for growing root crops, silica alone is sometimes needed to condition the soil.

Occasionally on this page we have expressed concern about the growing absence in soils of the trace elements such as boron, manganese, copper, molybdenum, cobalt, etc. Our authors believe these are usually present in the very small amounts required by plants in nearly all soils. However, they warn, "Actually, their importance is entirely out of proportion to the minute quantities which satisfy the needs of plants, and to overlook them is a grave error which may lead to damage or loss."

It follows, therefore, as we have said before in these columns, that a lime, limestone, rock phosphate or gypsum fertilizer which contains some of these elements, even in parts per million, should be more valuable on that account. Few rock analyses made in the ordinary way are precise enough to show the content of these trace elements, but it may be well worth the cost to have such analyses made, for it would certainly provide an excellent sales argument to any user well enough informed to understand their importance. The authors do not advise adding such trace elements to the soil in the form of their salts for fear actual harm may be done unless really needed and properly distributed, which would be very difficult with salts in any concentrated form.

Agricultural limestone producers are more or less familiar with the part that nitrogen-fixing bacteria play in crops like clover, the legumes and other plants which are plowed under for green manure. Lime for such crops is frequently necessary to provide the right environment for these bacteria. The authors reiterate throughout the book that available nitrogen is the element most frequently in short supply. Under proper soil culture the nitrogen may be kept at a safe level, but many factors are involved, and it is generally necessary to add nitrogenous fertilizers. Liquid ammonia is the newest of such fertilizers, and remarkable results have been obtained from it.

Considerable space is devoted to properties of mineral colloids—small soil particles which carry electrostatic charges, positive and negative. This is necessary to understand the theory of base exchange between such particles, for it is chiefly in this manner that the calcium and magnesium

Please turn to page 192

The Lorain Moto-Matic transmission is simple, easy to get at.

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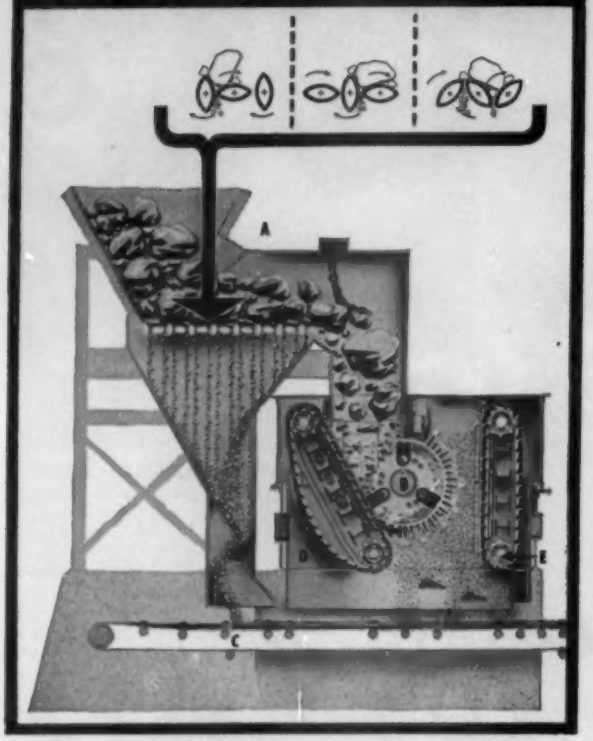

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ROCKY'S NOTES

continued from page 190

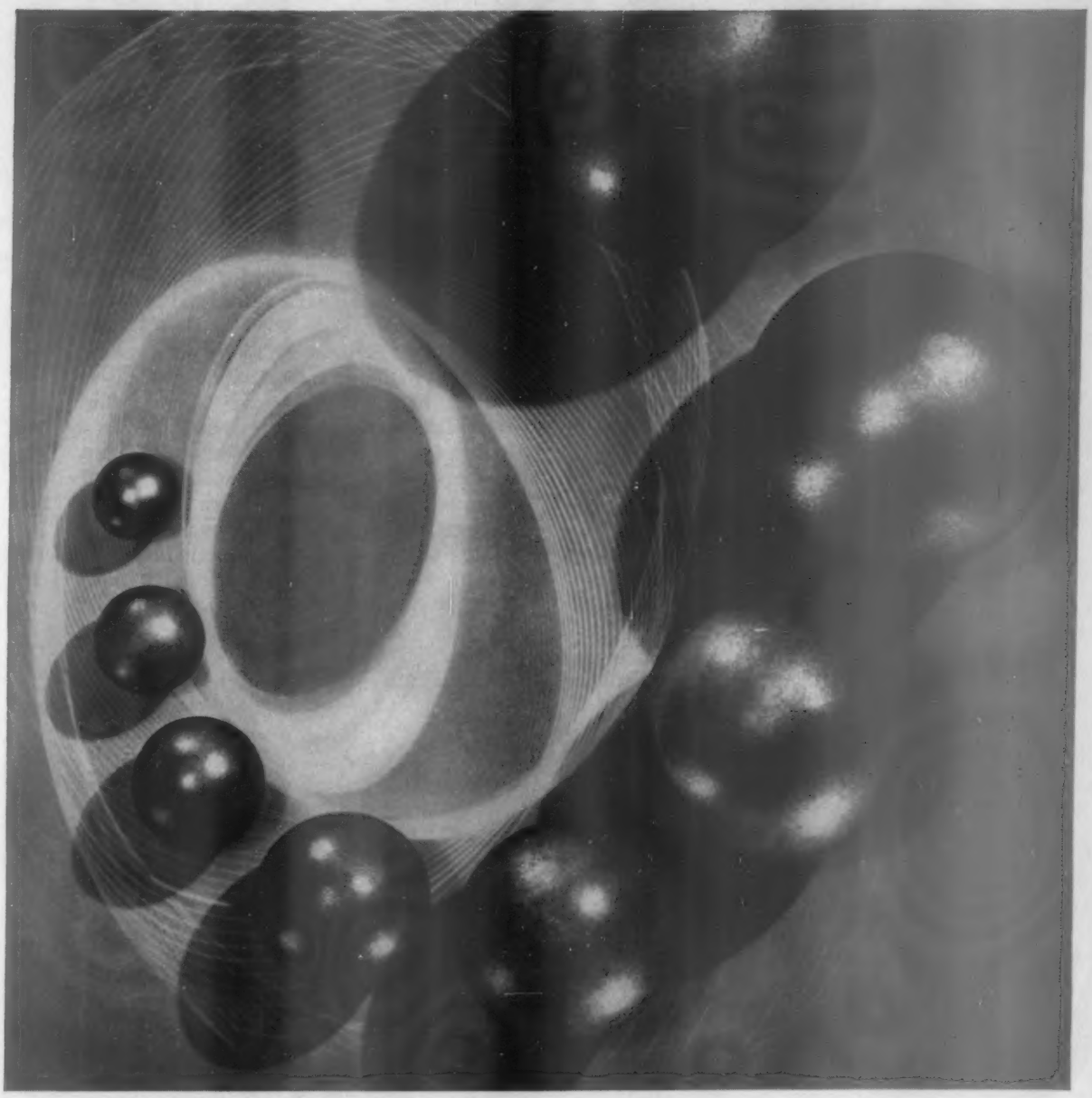
as ions (charged atoms) are taken up by plants. This process is also important in controlling the pH value of the soil, which is an all-important factor.

It may appear strange to many of us but, according to our authors, plants are frequently damaged by over-doses of mineral fertilizers. "Plants are not equally sensitive to an over-concentration of all substances [and this includes lime, of course]. Furthermore, their tolerance to over-concentration of various salts in the soil solution varies under the influence of numerous factors, such as air temperature, light intensity, carbon dioxide content of the air and of the soil atmosphere, relative humidity, wind velocity, rainfall, kind and age of the plant, rate of growth, type of soil and pH of the soil. Translated into action, this means that under one set of conditions a fairly heavy application of fertilizer may produce perfectly satisfactory results, while the same amount under a different combination of circumstances may cause serious damage. This is a rather frequent observation and emphasizes the previous admonition to apply fertilizer salts in several light doses rather than in one heavy one."

We would judge from a careful reading of the whole book that this advice is particularly applicable to lime. The seller is too apt to think that if lime is required, the more the better, but one can readily see from the foregoing that this is not so. Calcium is one of the elements most easily taken up by the plant, and the calcium ion, carrying a double electrostatic charge, can replace too much of some other needed element. Later on in the book the authors explain that no matter how much the particular soil may need lime, it should be added in small annual increments, rather than in one large dose. The producer of lime naturally likes to book the largest tonnage possible from every farmer, but it would be far better for both to apply a small tonnage every year than to expect the impossible from one large application. No doubt every limestone producer has found customers who were dissatisfied with results, and a careful reading of this book will show why.

Limestone producers have always relied heavily on a low pH value in a soil analysis as the best sales argument for the use of lime. Yet our authors state: "One must always keep in mind that soil pH represents only one part of the whole soil picture. Its importance comes into focus only when it is considered in conjunction with all the other factors which influence plant growth." The subsequent discussion of the pH scale and the causes of soil acidity or alkalinity will be found

Please turn to page 194



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continued from page 192

very helpful. It explains how lime causes alkalinity. But ammonium also makes soil alkaline, and more and more ammonium in liquid ammonia form is being used every year, at least in the central West. Under such conditions, the limestone producer may have to modify his sales argument by emphasizing the plant nutrient value of calcium and magnesium in his product.

We do find some confirmation for our theory often expressed in these pages: that the day may come when pulverizing and applying all kinds of rock dust for fertilizer may become an important industry. Both plants and animals, including man, derive their life processes from the variety of mineral substances found in the bedrocks of the earth and ultimately dissolved in sea water. The soil, derived from millions of years' fragmentation and natural decay of the bedrock, is but a very shallow covering over a very small part of this earthly planet. However, even this naturally pulverized rock is not an end product.

As our authors state it: "The soil which is employed to raise crops is, indeed, quite the opposite of an end product, and the very fact that the particles of which it is composed are subject to further decomposition and are not end products is an essential attribute of a fertile soil. The continuously proceeding decomposition of rocks and minerals into soluble substances represents invaluable reserves of plant nutrients which become available gradually. Without these immense reserves, even the most skillful soil treatment could not prevent rapid and final soil exhaustion, and the restoration of an overcropped or mistreated soil—which has been robbed of most of its available nutrients—would be well nigh impossible."

That, of course, is saying that fertilizers can never take the place of the natural soil resources. But fertilizers obviously do help to exhaust those resources, and their replacement by natural means is exceedingly slow, even when soil is most carefully cultivated. Man can, if the economics justify, hasten nature's process by mechanically pulverizing all kinds of rocks—particularly the granite and other bedrocks of the earth's crust. If it ever becomes necessary—in attempting to feed a rapidly increasing population—to intensely cultivate small tracts of land, it is entirely possible that there will be a market for pulverized rock as such.

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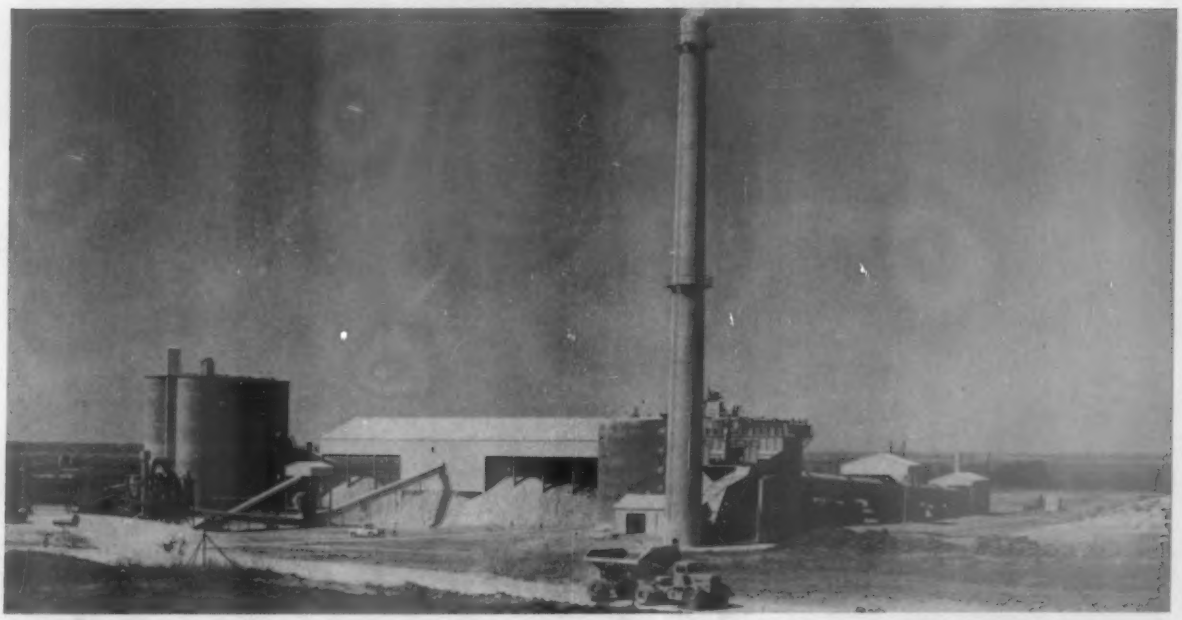

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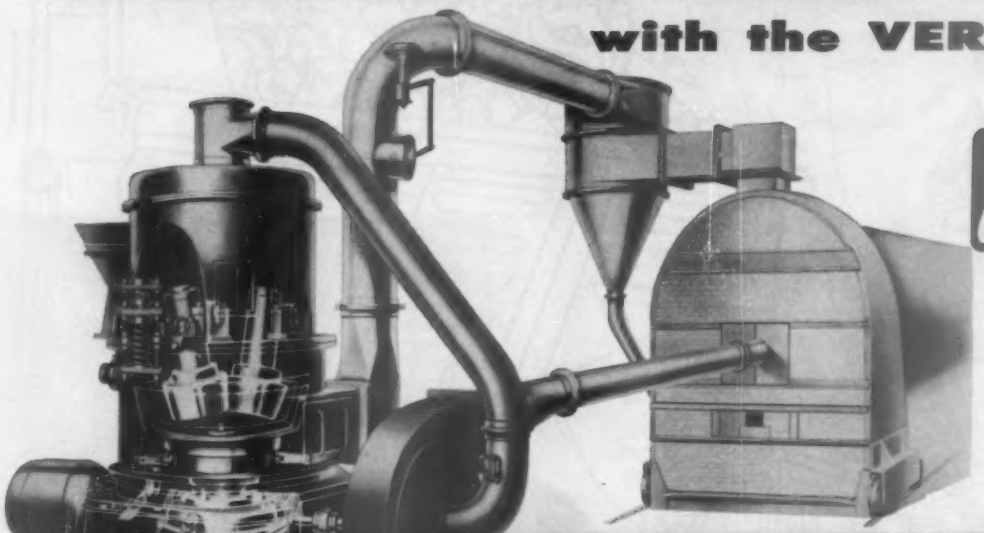

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TRUCK TALK

by CHET CUNNINGHAM

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ARE YOU GETTING top efficiency out of your ripping operations? Track type tractors in single or tandem are often used for ripping.

Here the key factor is the choice of the ripping tip. Tip selection is shown in the following three examples:

A limestone quarry manager replaced blasting with ripping. Rock was extremely hard. Tandem ripping was needed with strong ripper tips.

A high-strength forging of large proportions—four inch point—was used. The tip blunted after only 15 percent wear, and it was replaced, but still it was the most economical tip to use.

Overburden removal in Pennsylvania: Ripping was not difficult, so a narrower tip was used. The tip was tapered to a 2½ inch point and was undercut for self-sharpening. Because of this feature the tip was used until it had worn the entire point down to the shank cavity.

On a highway job in the southwest: The contractor hit a section of decomposed sandstone. He had to break it up for wheel scrapers. Ripping was easy, but the very abrasive action caused high wear rates on the tips. Here a tip and boot combination gave the most economical results.

These three examples do not cover all ripping tip types or all application, but are three of the most common type problems.

It's that time of the truck year again to be thinking about a cooling system servicing for every water-cooled rig in your operation. Be sure to include the wheel and crawler-mounted tractors, the cranes, crusher motors, scrapers, trucks and fleet cars. Make it a spring gargle this way:

- Drain your cooling system. If a lot of rust shows, flush out the system completely, using a cleaner if you need one.
- Even if the coolant is clean, the rust inhibitors probably are used up. Some metals can corrode without coloring the coolant.
- Look for leaks in your hoses and hose connections around "freeze-out" plugs, gaskets, water pump seals and heater fittings.
- Fill the radiator with soft water and a good rust inhibitor. Inhibitors lengthen the life of a cooling system. Use one.
- Don't save used anti-freeze—even permanent type. "Permanent" means only that it won't boil away. It loses its rust inhibitor's effectiveness after one season's use. Throw it out.
- Refill system, run engine and check for water leaks. Be sure the radiator core is free of dirt and insects by blowing it out with an air hose. Check temperature gauge. Check for coolant loss.
- A good cooling system check right now can save you a lot of potential trouble this summer.
- If you use the new "year-round" type of cooling system fluid, check it to see if it is good for another year. Dow Chemical says its Dowgard fluid is good for two years.

Is the dipstick in your rock products rig the right length? Before you say, "Yes," check it. Dipsticks can get shifted from one engine to another in the best of shops—and it causes trouble.

If your spark plugs are continually oil fouled with high oil consumption, take an extra look at that dipstick. If it is too short for the engine, oil is added when it should not be. This overloads the crankcase, and can also lead to oil fouled plugs, loss of oil, and oil blowing out the crankcase breather.

END

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② lower maintenance costs

Take it from Mammoth Coal Co., of Raven Run, Pennsylvania... one of the surest... and quickest ways to reduce off-road hauling costs is to use LeTourneau-Westinghouse Haulpaks. Here, Mr. Walter C. Bohler, shop foreman for Mammoth Coal, tells you why.

"Our operation here at Mammoth Coal is tough on trucks. This anthracite coal weighs 1800 lbs per yd, and overburden (mostly rock), 2600 lbs per yd, so when our 6-yd shovel drops a dipperful into a truck, it's quite a jolt. And our trucks work 13½ hours a day, loading in restricted areas, hauling capacity loads up to 7 miles with grades to 13%.

"How have our two 32-ton Haulpaks been performing?... Well, we find operating expenses *greatly reduced*. One of our Haulpaks has run 400 hours without even a body dent... the other has needed only minor repairs. We will also save money when servicing these units, because they have *fewer components* than our other trucks of similar capacity. In addition, the Haulpaks use less fuel — *20 gallons less per 7-hour shift!*

"Another important Haulpak advantage we like is its short turn radius. Since our trucks usually have to load in narrow areas between steep pit walls, we find Haulpaks can get in-and-out of loading areas with no time wasted jockeying back-and-forth. This saves us valuable time and permits our Haulpaks to complete as many as *3 extra cycles per day!*"

TWO MORE LW Haulpaks were delivered to Mammoth Coal at the time this report was ready for printing. Further proof of satisfied performance! Mammoth's new Haulpaks have 550 hp, 60-ton capacity.

Mammoth's 6-yd shovel loads Haulpak with capacity load *fast*. V-body gives you *bonus* yardage within an exceptional short wheelbase. Maneuverability: 32-ton Haulpak makes 180° turn in area only 44'6" wide.

Another load of overburden at Mammoth Coal Co. is dumped in a hurry! Haulpak's twin 3-stage hoists lift body in seconds to a high angle for fast, complete ejection of load. Body is exhaust heated, prevents materials from freezing and sticking. There's no load "carry-back" problem with Haulpak.

32-ton Haulpak highballs load over mine road for Mammoth Coal Company. LW's exclusive Hydrair® suspension cushions against loading and travel shock . . . keeps unit riding level.

Want to learn how LeTourneau-Westinghouse Haulpaks give you lowest net cost per ton-mile? We'll be happy to show you! Five sizes, 22 to 60 tons, up to 550 hp. Ask to see our 15-minute film, "Revolution on Wheels". No obligation.

HP-2302-MJ-2

LeTOURNEAU-WESTINGHOUSE COMPANY, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

Where quality is a habit

NEW LITERATURE

FOR FREE INFORMATION on these items, simply fill out and mail postage-paid Reader Service Card found elsewhere in this issue

Straightline vibrating feeders

LINK-BELT CO.'S vibrating feeders which incorporate a new principle of vibration for high-capacity, controlled feeding of heavy and highly abrasive bulk materials, are described in a 6-page folder. The vibrator produces its feeding motion by two unbalanced shafts driven in opposite directions by individual pancake motors. The combination of speed, stroke intensity and straightline action of the vibrator results in effective feeding.

Two models can be either cable-suspended or floor-mounted, and are available in 30 sizes with capacities up to 1,350 tph. Reinforced universal brackets provide for floor, ceiling or combination floor and ceiling mounting. Selection and application data based on feeder size and total vibrating weight are also given in the folder.

Enter 500 on Reader Card

Products brochure

AMERICAN-STANDARD INDUSTRIAL DIV. has made available a 20-page, 4-color illustrated brochure describing the company's facilities, products and markets. Called "Profile," the new brochure is designed to present an insight to the Industrial Div. for architects, engineers, contractors, building owners, plant management, public utility personnel, and other users of air conditioning, air handling, heat transfer and fluid drive equipment. The publication describes the division and discusses application of equipment. The line of equipment is both described and illustrated.

Enter 501 on Reader Card

Basic brick literature

H. K. PORTER CO., INC., Refractories Div., has announced the availability of literature on its basic brick products. These bulletins cover chrome-periclase brick, controlled composition chrome-periclase brick, periclase chrome brick, and high-purity periclase brick. Featured in the literature is the company's steel cladding, which provides built-in expansion, eliminating the need for paper shims. The bulletins describe what the products are, where they are used, how the user benefits, physical properties and where to order.

Enter 502 on Reader Card

Lubricating systems

FARVAL DIV., Eaton Mfg. Co., has issued a brochure that covers the company's complete line of lubricating systems that can be installed on machinery already in service. They can also be specified and included on equipment purchased. Included in the illustrated brochure are measuring valves, spray control valves, basic manifold components, pumping units and typical system layout.

Enter 503 on Reader Card

Nuclear gauging systems

THE OHMART CORP. has issued a folder that describes details, method of operation, and specifications for nuclear gauging systems to be applied in the measurement of liquid, solid or slurry levels or interfaces. Schematic drawings show six types of applications, while photographs illustrate component equipment. Other sections cover radioactive sources and source holders, detectors, zero suppression, and amplifier/indicator.

Enter 504 on Reader Card

Digging and hauling by slackline cableway

SAUERMAN BROS., INC., has introduced a new catalog that shows how deep digging slackline cableways are used to recover sand and gravel deposits, clean river channels and settling ponds, and excavate and haul bulk materials. A table shows capacities of each size machine at varying haul distances. Components of the slackline are described in detail. Pictures and drawings cover installations.

Enter 505 on Reader Card

Safety leaflet

THE NATIONAL SAFETY COUNCIL, in cooperation with the Institute of Industrial Launderers, have issued a leaflet which describes "the seven deadly sins of work garments" which may serve as an eye-opener to many companies. Garment safety is an obvious, but frequently overlooked area of safety, the leaflet notes. It is pointed out that ripped or torn clothing, trousers or cuffs, oil or chemical-soaked clothing that is not changed frequently enough—these and other commonplace causes can lead to serious accidents. Serious falls, getting an arm or leg caught in moving machinery, burns, skin rashes, infections—these are a few "typical" accidents.

Enter 506 on Reader Card

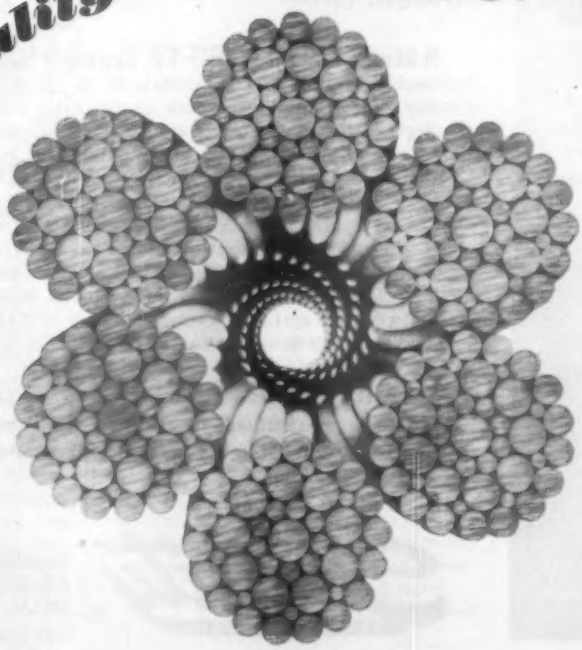
Please turn to page 205

Any way you look at Roebling Royal Blue Wire Rope, there's real savings in it for you. In its inner and outer uniformity. In its *extra*-high strength. In unison, these qualities provide unrivalled resistance to abrasion, impact, crushing and tough sheave pressures. Royal Blue—inside and outside—goes on paying off for you when lesser wire rope would need replacing. Find out more from your wire rope distributor, or write for free booklet to Roebling's Wire Rope Division, Trenton 2, New Jersey.

ROEBLING

Branch Offices in Principal Cities
John A. Roebling's Sons Division
The Colorado Fuel and Iron Corporation.

quality inside and outside



We put a lot of work into it—
You get a lot of work out of it

Enter 1109 on Reader Card

For Lowest Drilling Costs, Specify...

Security®
SUPER-AIRE
BLAST HOLE BITS

for your drilling requirements

S SERIES — For Soft Formations* Designed to effectively drill the complete range of softer formations . . . shales, soft sandstone, soft limestone. Maximum offset of cones for greatest twisting — tearing action and long teeth assure fastest penetration rates. Self-cleaning action of cutter designs and placement of air courses prevent balling up and permit rapid removal of loose particles from bottom of hole.

M SERIES — For Medium Formations* General purpose bits for fast drilling of medium hard limestone, shaley limestone and other medium formations. Moderate offset is employed to increase penetration rates. Additional gage protection is provided by "T" tooth designs where formations are abrasive. Special cutter features, combined with sturdy tooth design, of these versatile bits, offer greater strength to withstand heavier drilling weights in harder formations.

H SERIES — For Hard Formations* Especially designed for use in harder formations, such as dolomite, hard limestone, traprock. Sturdy teeth, closely spaced on extremely strong cones, are capable of withstanding heaviest drilling weights. Gage tooth configurations are available with "L", "T" and full webb sections for hardest and most abrasive formations that can be cut with steel toothed bits. True rolling, non-offset cutters and extra large bearings assure longest life.

H SERIES INSERT TYPE — For Extremely Hard Formations* Tungsten carbide insert bits are available in three types for hardest, most abrasive formations such as granite, etc. An exclusive Security feature of this series is the special placement of compacts for full gage protection and maximum gage cutting. H8 series features large compacts spaced on raised cutter structures for maximum ventilation and best penetration rates. H10 type, designed for hardest formations possible to be drilled, employs closely spaced large compacts in a "hunting tooth" pattern to avoid tracking and to maintain full coverage of bottom hole. H10 features rugged spear points with spirally placed compacts. H9 series is mid-way in hardness range between H8 and H10. Security insert bits have conical shaped points on compacts insuring faster penetration rates.

Security SUPER-AIRE bits feature extra-large, self-cleaning screens, maximum capacity bearings, and air passages to bearings unrestricted by ball retainer plugs as in other bits.

**Jet air or regular air types available. Send for catalog.*

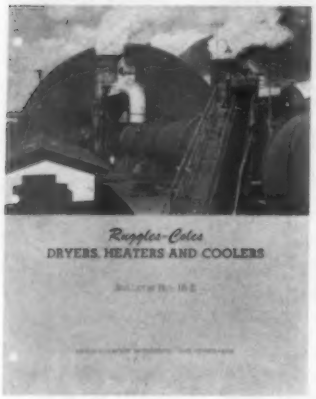
Security®
ENGINEERING DIVISION
P. O. BOX 13647
DALLAS, TEXAS

DRESSER INDUSTRIES, INC.

Enter 1110 on Reader Card

NEW LITERATURE

continued from page 202



Dryers, coolers & heaters

HARDINGE CO., INC., has just published a revised, 24-page catalog on its line of dryers, heaters and coolers. The catalog includes new material on fundamentals of drying, selection of proper drying equipment and drying economics. It is illustrated with photographs and sketches showing distinguishing features of the company's direct and indirect-type dryers, water and air-cooled rotary coolers, and other rotary equipment.

Enter 507 on Reader Card

"The Inside Story"

CATERPILLAR TRACTOR CO. has issued a booklet entitled, "The Inside Story." The book points up some of the differences, both large and small, which mean longer life and greater production for engines when original manufacturers' replacement parts are used. The booklet offers specific examples of the "little things" which have been found important in the company's experience of building its engines.

Enter 508 on Reader Card

Excavator catalog

MANITOWOC ENGINEERING CORP. has published a 16-page pictorial catalog describing its excavator with 6-yd. shovel or 7-yd. dragline capacity. Featuring a new concept in the design of excavators—variable independent control—the unit has integrated operating levers. These levers serve both as controls and as engine throttles. Also featured are interlocked front and rear drums with double-drum braking surfaces for dragline operation, and independent two-engine power with torque converter drive.

Enter 509 on Reader Card

Single-roll crushers

THE PENNSYLVANIA CRUSHER DIV. of Bath Iron Works has published a 12-page bulletin describing its single-roll crushers. This bulletin is the first formal information available on the new crushers for primary crushing. It covers in detail the operation of the crushers and of the patented overload release that automatically resets the breaker plate for correct product size. The bulletin also includes construction specifications, capacity tables and detailed dimensions.

Enter 510 on Reader Card

Construction equipment

FORD MOTOR CO. has made available an illustrated, 4-color brochure covering the company's line of equipment for construction. The brochure describes in detail the company's units for heavy and light excavating, heavy and light loading, for scraping, leveling, grading, and for lifting, towing and general utility.

Enter 511 on Reader Card

Safety switch bulletin

FULLER CO. describes an improved-type motion safety switch for protecting machines, equipment and processes against damage resulting from stoppage or reduced speed in an illustrated, 4-page bulletin. Design, installation and operation of the improved switch are described, as well as typical applications. Two installation photographs and a cutaway drawing of the switch are included.

Enter 512 on Reader Card

Product catalog

BONDED SCALE & MACHINE CO. has released a price list and condensed catalog of the company's line of material handling equipment. Included in the catalog are illustrations, descriptions and specifications covering conveyors, bucket elevators, vibrating screens, crushers, feeders, belting and parts.

Enter 513 on Reader Card

END

Another Example of Reduced Maintenance Costs *(Performance Study #387)*

Until three years ago, Barton Contracting Co., Osseo, Minn., contractor on the Minneapolis-St. Paul Freeway System, had used ordinary grease and oils in their fleet of 80 tandem trucks, asphalt plants, and heavy equipment such as the Rex paver, shown below.

Then, an International 180 Tandem lost its rear-axle plug. With a dry box, noise and overheating, a costly repair job seemed certain. ALMASOL 608 (SAE 140) GEAR LUBRICANT was installed, with no further work on the assembly, *and it has run without maintenance and practically no make-up oil for the three years since!*

Similarly, serious gear overheating was occurring on Barton's Bucyrus-Erie shovels and cranes, subjected to very heavy operating conditions. ALMASOL 607-608 GEAR LUBRICANTS reduced frictional heat and the need for make-up oil to an absolute minimum!

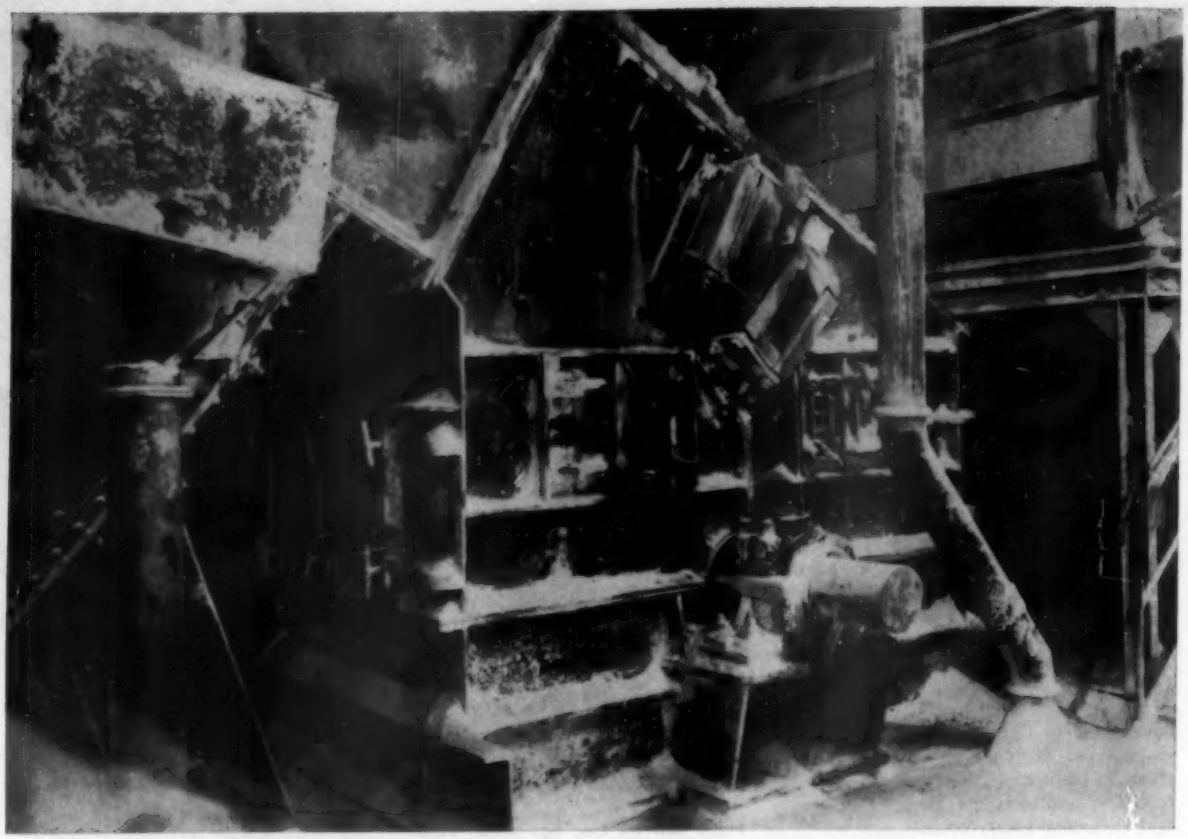
HERE'S HOW YOU CAN CUT *YOUR* EQUIPMENT MAINTENANCE COSTS: send today for complete information on ALMASOL 607-608 GEAR LUBRICANTS.

WRITE, WIRE OR PHONE DEPT RP-3

LUBRICATION ENGINEERS INC.
Fort Worth 11, Texas
Custom Built Lubricants for Heavy Equipment

LE-61-3

Enter 1074 on Reader Card



JOY-Hazemag Impact Crushers produce uniform products in limestone operation

Joy-Hazemag Impact Crushers are ideally suited for the cement industry because of the high reduction ratios and the very uniform product. Reduction ratios up to 50:1 can be achieved, and crushers with capacities up to 500 tons-per-hour are available in the Joy-Hazemag line.

In addition to the operating advantages of the Joy-Hazemag Impact Crushers there are good, sound economic reasons for their use in the cement industry. They offer very high capacity per dollar of invested capital compared with other types of crushers and pulverizers creating 10 mesh products. Large access doors give easy accessibility, maintenance is simple and wear rates are low. The large, heavy rotor of the Joy-Hazemag Crusher gives a "flywheel" effect, for smooth operation and low power consumption.

Joy-Hazemag Impact Crushers will provide a better crushed product at lower cost in any limestone crushing operation. For details on how they can save you money, consult your Joy representative or write for Bulletin 3295-27.

EQUIPMENT FOR QUARRYING . . . FOR ALL INDUSTRY

JOY

Joy Manufacturing Company
Oliver Building, Pittsburgh 22, Pa.

In Canada: Joy Manufacturing Company (Canada) Limited, Galt, Ontario

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READER-SERVICE CARD

RP-5-61

ROCK PRODUCTS
79 W. Monroe St.

MAY, 1961
Chicago 3, Illinois

Cannot be serviced after July 1, 1961 postmark.

Please print or type

Name_____ Position_____

Company (In Full)_____

Company Address_____ City_____ Zone____ State_____

Send information on items identified by key numbers beside or below items of interest to you. List your choice in numerical order. Limit 10 per card.

(1) ..... (2) ..... (3) ..... (4) ..... (5) .....

(6) ..... (7) ..... (8) ..... (9) ..... (10) .....

IF NO KEY NUMBER, USE COMPANY NAME

BUSINESS REPLY MAIL
No Postage Stamp Necessary If Mailed in the United States

FIRST CLASS
PERMIT NO. 1417
CHICAGO, ILL.

– POSTAGE WILL BE PAID BY –

ROCK PRODUCTS
79 WEST MONROE ST.
CHICAGO 3, ILL.

MONEY-MAKING IDEAS FOR YOU - - - FREE

HOW TO USE THIS SERVICE

1. **Advertised Products**
2. **New Machinery**
3. **New Literature**

There is a wealth of valuable information in the manufacturers' booklets offered in this issue. For your convenience, each advertisement, each new machinery and new literature item has been given a key number. Simply fill in the proper key number in the appropriate space on the card above and send it to us. We'll do the rest.

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"My Boss Read the Specs with Tears in His Eyes"

He looked like he'd lost his best friend — money.

"Goodbye contract," he said quietly. "We just can't hope to meet these government specifications for aggregate."

"Yeah, it's pretty hopeless with our set-up. Of course, if we had a hydraulic classifier — " (I was kidding.)

"You're out of your mind. Around here water costs more than sand."

"Well how about an air separator, like Sturtevant makes?" I shot back. "Pete's brother runs a pit at Rapid City and says they clean sand without water. By de-dusting it."

He was skeptical. "Aren't Sturtevants for cement?"

I nodded. "They are, but you see quite a few in aggregates, too, nowadays. Might be worth a try."

The Boss smiled for the first time that morning. "What the heck are you waiting for? Get 'em on the phone and let's see what they can do."

So we got the contract, thanks to the 12 ft. Sturtevant we now use for de-dusting and pre-classification. It's a beaut. Gives good service outdoors the year round, with no protection except for the motor housing.

If you're in this business, Brother, it might pay you to have a good long look at what a Sturtevant can do for tight aggregate specifications.

Sturtevant Air Separators classify production loads up to 150 tph by exact control of air currents and centrifugal force. Simple, quick adjustments make possible the selection (or rejection) of particles in the 30 to 400 mesh range. Nine standard models available, varying in size from 3′ to 18′.

Learn how a Sturtevant Air Separator can help your aggregates production. Write today describing your needs. Address: Sturtevant Mill Co., 102 Clayton St., Boston 22, Mass.

STURTEVANT AIR SEPARATORS CLASSIFY SAND WITHOUT WATER

PRODUCING CLEAN SAND, the Sturtevant acts as a de-duster by removing fine mesh particles from the throughput. Particularly valuable where water is limited.

EASING SCREEN LOADS, the Sturtevant rejects unwanted fines and circuits coarser sizes to screens for grading. By this pre-classification, the possibility of blinding screens with fines is minimized and output considerably increased. Also, excessive dust problems are eliminated.

WHEN BLENDING IS NECESSARY, the Sturtevant selects fines from the crushing operation. This stockpiled product then can be used in the blending operation to overcome fineness modulus deficiencies.

GRINDERS
CRUSHERS
PULVERIZERS
MICRON-GRINDERS

STURTEVANT MILL CO.

Dry Processing Equipment

The "OPEN-DOOR" to *lower* operating costs over *more* years

MIXERS
BLENDERS
ELEVATORS
AIR SEPARATORS

Enter 1112 on Reader Card

NEW PATENTS

by OLIVER S. NORTH

RECENTLY ISSUED PATENTS ON NONMETALLIC MINERALS*

Cement

Canadian 606,268—Improved apparatus and method for cooling hot **portland cement** clinker wherein a cooling gas is passed through a layer of the clinker. The thickness of this layer is caused to vary along the length of the cooling zone, so that gas flow is uniform throughout the entire area of the layer. (to N. E. Andersen; assigned to F. L. Smidth & Co.)

Canadian 607,274 — Fluidized-bed process for manufacturing high-quality, relatively low-cost **portland cement.** Dry, finely divided raw materials are charged into the reactor, and an alkali-free, finely divided clinker produced. (to R. Pyzel)

British 849,175—A white coating composition for concrete block or other concrete surfaces comprises **white portland cement** and up to 7.5 percent of a white additive, e.g. titanium dioxide. (assigned to Klocker-Hutte-Bremen A. G.)

British 849,717—Method for controlling the compositions of gases in vertical kilns used for producing **lime, portland cement** and the like by reducing the proportion of free oxygen in the blast. (to F. K. Kafka; assigned to Cement Engineers Ltd.)

U. S. 2,946,357—Apparatus and method for packing pulverulent **lime, portland cement, talc, clay** and the like into containers whereby the bags are tightly packed but little if any of the powder is permitted to escape. (to A. C. Hobbie & J. W. Holdcraft; assigned to Pittsburgh Plate Glass Co.)

U. S. 2,946,627—System for the pneumatic transport of loose **portland cement.** (to E. Polzinetti, one-half to Cementi Elba Soc. per Azione)

U. S. 2,947,643—In the production of a **hydraulic cement,** a mixture of 75-92.5 percent of relatively high-magnesia water-granulated **blast-furnace slag,** 0.1-4 percent calcium oxide or other alkaline reactor, and the balance gypsum or other retarder is ground to optimum fineness. The fineness of grind is critical to overcome the presence of a comparatively high percentage of magnesium oxide. (assigned to J. Kamlet)

Canadian 591,635—Improved method for firing a kiln, particularly a **portland cement** rotary kiln, with pulverized coal. (to G. H. Frangquist; assigned to Combustion Engineering Co.)

U. S. 2,945,688—In the production of **white portland cement,** pellets of a material that is low in iron, chromium and manganese are preheated, sintered and finally cooled on a moving grate. Initial cooling is effected in a reducing atmosphere. (to H. Pajenkamp, A. Russ, H. zur Strassen, K. Meyer & H. Rausch; assigned to Dyckerhoff Zementwerke A. G. and Metallgesellschaft A. G.)

British 837,883—In an installation for the cooling of **portland cement** clinker, use is made of an outer rotating ring-shaped grate enclosed in a spiral wall, additional cooling means within the outer ring, and pipes connected with cooling air blowers. The speed of rotation of the outer grate ring is regulated to correspond to the output of the rotary kiln. (to H. Habel; assigned to VEB Zementanlagenbau Dessau)

U. S. 2,945,687—Design for an apparatus for drying and preheating filter-cake or nodules of **portland cement** raw mixes, **lime** raw materials, etc. Discharge of the dried material into the rotary kiln takes place evenly and progressively around the circumference of the hearth. (to G. G. J. Davis; assigned to Associated Portland Cement Manufacturers Ltd.)

Fluorspar

U. S. 2,932,557—Method of producing hydrofluoric acid by charging the reaction furnace with a homogeneous mixture of **fluorspar** and sulfuric acid prepared under certain specified conditions, using a worm mixer for thorough kneading of the acid-fluorspar slurry. (to H. List and R. Wollak; assigned to Buss A.G.)

British 826,729—Method of making a rubber- or resin-bonded abrasive composition which includes a mixture of a granular iron sulfide mineral and **fluorspar, cryolite, phosphate rock** or **rock salt.** (to J. Wilkinson; assigned to The Carborundum Co.)

British 829,639—In the recovery of rare earth values from uranium-containing solutions, ground **fluorspar** is mixed with the solution, and the mixture autoclaved. The rare earths are adsorbed onto the fluorspar. (assigned to United Kingdom Atomic Energy Authority)

Aggregate, lightweight

U. S. 2,946,112—Process for pelletizing and sintering an aqueous mixture of fly ash and **bentonite** to produce a **lightweight aggregate** of controlled quality and particle size without the necessity of screening. (to L. G. Tucker, Jr., and A. J. Kantor; assigned to Koppers Co.)

U. S. 2,948,630—In an oven for producing **expanded clay** or **expanded slate lightweight aggregate,** sticking to the hearth bottom is prevented by exteriorly cooling the hearth from below just enough to eliminate sticking of the material being bloated. (to H. A. R. Holm)

British 837,382—In the manufacture of **expanded clay** or **expanded shale lightweight aggregate,** a mixture of fly ash with clay and/or shale is fired at 1500-2400 deg. F. in a substantially non-oxidizing atmosphere. (assigned to G. & W. H. Corson, Inc.)

Please turn to page 212

*Copies of United States patents are available at a cost of 25 cents each (photostat copies of foreign patents at 30 cents per page) from The Commissioner of Patents, Washington 25, D.C. For convenience, coupons, each good for one copy of any patent, may be purchased from that official at the rate of $5.00 per 20-coupon pad or $25.00 per 100-coupon pad.

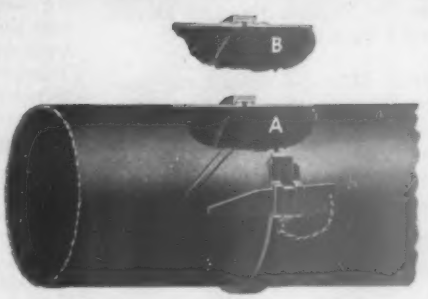
You're SAFE Underground With This NAYLOR Combination

You can't beat the combination of NAYLOR Spiral-weld pipe and Wedgelock couplings for providing fresh air and getting rid of gases and fumes in underground operations.

This light-wall pipe has built-in extra collapse strength and safety for push-pull ventilation. It's easy to handle—easy to install. And you save more valuable time when you use Wedgelock couplings. These easy-to-use connections enable you to couple joints with only one side of the pipe in the open. Lines hug the wall and can be extended quickly as work progresses.

It will pay you to get the details on this time-and-money-saving combination for air, water, tailings or ventilating service.

Ask for Bulletin No. 59



The NAYLOR Low-Pressure Wedgelock coupling for ventilating service can be furnished for pipe with (A) accurately-sized shoulder ends or (B) with grooved ends. A hammer is the only tool needed to connect or disconnect this coupling.

NAYLOR PIPE *Company*

1237 East 92nd Street, Chicago 19, Illinois

Eastern U. S. and Foreign Sales Office: 60 East 42nd Street, New York 17, N. Y.

Enter 1113 on Reader Card

NEW PATENTS

continued from page 210

Clays

U. S. 2,956,753—Design for a two-stage blunger for receiving crude **kaolin** from the pit and reducing it to a slurry. The lumps of clay are rapidly shaved in a pool of water while the slurry is strongly agitated to break up the small pieces. (to C. Williamson; assigned to Georgia Kaolin Co.)

U. S. 2,957,381—A valve pad for musical wind instruments consists of **kaolin,** polyvinyl chloride and dioctyl phthalate or other plasticizer. (to H. S. Hillyard)

U. S. 2,958,580—Production of aluminum sulfate from aluminous **clay** that is high in iron oxide impurities. (to H. Loevenstein; assigned to Harvey Machine Co., Inc.)

Canadian 607,409—Use of **hectorite** or Wyoming **bentonite** as a flocculation aid in the single-stage sedimentation clarification of water. (to D. J. Pye & G. F. Schurz; assigned to Dow Chemical Co.)

British 847,723—Use of lithium stearate along with **bentonite** or **fuller's earth** in a parting agent for releasing synthetic resin from mold or former surfaces. (to L. N. Phillips; assigned to National Research Development Corp.)

British 847,852—Method for producing a pozzolanic material from residues produced in the beneficiation of **kaolin** and using the resulting product for making regular or foamed concrete. The residue is calcined and then ground to optimum fineness. (to H. O. Dering; assigned to English Clays Lovering Pochin & Co. Ltd.)

British 850,393 — A bituminous paint comprises 65 percent asphaltic bitumen, 8 percent organiphilic **bentonite,** 2 percent an aliphatic amine and 25 percent solvent. (to C. V. Lawton & E. A. Duligals; assigned to Evode Limited)

Asbestos

U. S. 2,957,223—Apparatus for wire cutting into units of desired size semi-hardened cast insulation slabs made from **lime, diatomite** and **asbestos** fiber. (to J. C. Hamilton; assigned to Owens-Illinois Glass Co.)

U. S. 2,958,443—Use of **asbestos** fiber in a polyethylene or polypropylene base composition used to make bottled beverage carriers. (to J. L. Hutchinson; assigned to The Richardson Company)

Canadian 605,799—Use of a substantial amount of **asbestos** fiber in a high temperature-resistant dryer felt for papermaking machines. (to D. V. Asten & J. G. Schoepf; assigned to Asten-Hill Ltd.)

Canadian 606,428—Apparatus and method for preheating in a self-cleaning container slurries to be used in the manufacture of insulating materials, e.g. a mixture of **lime, diatomite, asbestos** fiber and water. (to H. P. Hoopes & W. P. Riesenberg; assigned to Fibreboard Paper Products Corp.)

Canadian 607,089—Method for incorporating relatively large quantities of **asbestos** fiber in papermakers' dryer felt. (to T. Hindle & E. Race; assigned to Scapa Dryers Ltd.)

Gypsum

U. S. 2,956,859—Process for preparing pigment grade anhydrite from **gypsum.** A 20-50 percent solids gypsum suspension is treated with a limited amount of sulfuric acid to seed the slurry. A further portion of gypsum slurry is then added and the material boiled. (to W. Rodgers & C. R. Trampier; assigned to National Lead Company)

U. S. 2,957,493—Design for an improved apparatus for effectively dispensing lump or ground **gypsum** into a stream of irrigation water. (to A. Nilsen; assigned to Joaquin Agricultural & Engineering Co., Inc.)

U. S. 2,957,774-5—Method of making perforated **gypsum board** having a water absorption rate for the gypsum core substantially the same as that of the paper cover. The gypsum core contains intermixed therewith a Diels-Alder adduct of maleic anhydride and a natural resin acid, an acidic precipitant and optionally a lignin salt dispersant. (R. L. Selbe & R. E. Jacobson; assigned to U. S. Gypsum Co.)

Canadian 606,029—Improved apparatus and method for producing **gypsum plaster.** The calcining and grinding steps are integrated so as to achieve enhanced thermal efficiency, simplicity of control, reduction in apparatus requirements and the capability of producing a wide variety of grades of finished plaster. (to P. Landrieu; assigned to Soc. des Gypses & Platres de France.)

Canadian 606,037—Improved apparatus for forming a **gypsum board** having a molded facing integral with a cell-forming wall portion. (to S. H. Flower, J. Parsons & N. G. W. Loudon; assigned to Bellrock Gypsum Industries Ltd.)

Canadian 606,851—Method of making a laminated thermal insulation board from fiberboard and **gypsum board.** (to W. W. Wesner)

British 848,617—Method of preparing finely divided pigment grade anhydrite from **gypsum.** (assigned to National Lead Co.)

Lime

U. S. 2,956,867—Method for processing pressure-hydrated **dolomitic lime** to form a lime of high plasticity having improved soaking and hoddability properties. The pressure-hydrate is subjected to the action of an impact mill and then to a relatively short period of localized compression milling. (to J. Volk & F. E. Kinsinger; assigned to National Gypsum Co.)

U. S. 2,957,776—In a method for making temperature-stabilized, atmospherically hydrated **dolomitic lime** having improved plasticity when soaked and used at low temperatures, a dry powder admixture is made of a portion of tube-milled atmospheric-hydrate and a portion of non-tube-milled atmospheric-hydrate. (to J. Volk; assigned to National Gypsum Company)

Canadian 607,892 and British 850,-187—In the production of a lightweight silica powder product for rubber filling, an aqueous suspension of **silica sand** or the like is treated with **lime** at elevated temperature and pressure, and the resulting solids recovered by filtration and dried. (to R. Schrauf; assigned to Deutsche Gold-und Silber-Scheideanstalt vormals Roessler)

British 849,234—Method for stabilizing clayey or other highly plastic soils with a mixture of fly ash or other pozzolan, **lime** and sand or other inert aggregate. (to J. E. Havelin & F. Kahn; assigned to G. & W. H. Corson, Incorporated)

END

PROFITABLE EXPERIENCE *makes major cement producer a Long-Time* MANITOWOC *user*

In the Wampum area, limestone averages between 18 and 22 ft. in thickness, and is overlaid by shale which is also recovered for use in the mill. Here, one of two 3-yd. Manitowoc shovels loads broken rock into a 12-yd. truck. The Manitowocs feed a 450-tph crushing-and-screening plant.

Two more Manitowocs handling loading in company's newest quarry

In equipping a quarry serving its new mill at Wampum, Pa., this well-known cement company chose a pair of 3-yd. Model 3600 shovels to excavate shale and limestone. With a fleet of Manitowoc shovels already operating in other company pits, the choice was a natural one. In location after location, when final operating costs are figured, it's the Manitowoc that's handling more rock at less cost per ton than any other loading equipment.

There are good reasons why a Manitowoc shovel gives this kind of performance. Simplicity of design throughout the machine, with fewer gears, gives a Manitowoc full power at the dipper . . . enables it to cut through the toughest material. Long, wide-spread crawlers and a massive one-piece carbody provide needed stability for loading rock at a fast, even pace. Air controls and torque converter drive (available for most models) make the entire dig-and-dump cycle as smooth as it is powerful.

These are only the highlights of Manitowoc advantages that make repeat buyers of quarry after quarry. Your Manitowoc distributor will be glad to give you complete details.

Manitowoc **MANITOWOC ENGINEERING CORP.**
(A subsidiary of The Manitowoc Company, Inc.)
Manitowoc, Wisconsin

SHOVELS — 1¼ to 6 YDS. DRAGLINES — 1¼ to 7 YDS.

1-K

MANITOWOC

Enter 1114 on Reader Card

NEW MACHINERY

FOR FREE INFORMATION on these items, simply fill out and mail postage-paid Reader Service Card found elsewhere in this issue

Outstanding new heavy-duty belt

Hy-Impact is the name of a new belt that is being introduced after undergoing field tests in three different sections of the United States. For the past two years it has been successfully conveying various types of crushed stone from the primary crusher in both portable and permanent conveyor systems.

Fabric design in this belt is a radical departure from conventional fabric weave. Shock-Weve is the name given this new construction. It has more bulk, more flexibility and a greater all-around resistance to puncturing in all directions.

The Hy-Impact type of construction can be made in any grade or quality of belting to match standard 28, 32, 36 and 42-oz. standard belting fabrics and can be supplied in any of the standard synthetic fibers. Reinforcing members of the belt have a superior resistance to impact due to greater shock absorption. A specially developed cover, friction coat and skim coat were also developed for this belt.

The new belt can be used in any place or on any conveyor carrying rock or abrasive materials since it was designed especially for these materials. Even though Hy-Impact is more flexible because of its Shock-Weve construction, it still maintains ideal load support. It can also be used on 45-deg. troughing idlers.

Standard pulley diameters are used on the conveyors where these belts are now in operation, and they will operate on the same standard pulleys used with regular conveyor belting.

Installations at the test locations were 4 ply, 32-oz. Hy-Impact belts with $\frac{1}{8}$-in. top including breaker and $\frac{1}{16}$-in. bottom in the No. 2 grade of belting. After two years in operation each belt has carried over 500,000 tons of rock and abrasive materials. Each is still in operation and has an expected life of several hundred thousand tons more.

Although this new belt provides a greater service life than conventional belts, it is still priced at the same level. This belt reduces installation and operating costs to half or less because of longer life and reduction in downtime due to re-splicing and replacement. (Acme-Hamilton Mfg. Corp., Belting Department, Trenton, N. J.)

Enter 100 on Reader Card

New vibratory feeder

Para-Mount is the name of a newly designed vibratory feeder that offers infinitely variable control of feeding rates. The units may be used singly or in combination to give accurate control of materials in process. Capacities are available up to 750 tph.

Heavy-duty shear springs are used to develop the dynamic forces needed to vibrate the steel trough, while a 900-rpm. motor with small counterweights provides the necessary force. Adjustable-rate models use air springs and a full-range air control to achieve the necessary control over stroke and feed rate. (General Kinematics Corp., 132 W. Northwest Hwy., Barrington, Ill.)

Enter 101 on Reader Card

Please turn to page 216

How Union-Camp's 5-Star Plan saved multiwall bag user over $130,000 a year

Making things the same can sometimes make a whale of a difference. Particularly in a multiwall bagging operation. The Smith-Douglass Company, Inc., of Norfolk, Virginia proved it recently when they put Union-Camp's 5-Star Plan into action. The difference—in annual packaging savings—came to over $130,000 a year!

Standardize = Economize

Initial 5-Star Plan surveys at Smith-Douglass' six plants revealed that *standardization* held the key to major cost reductions. Three plants used sewn open-mouth multiwall bags. One used sewn valve bags. The remaining two plants used both types of bags.

Union-Camp's multiwall specialists showed that $30,000 a year could be saved by converting all six plants to sewn open-mouth bags and using open-mouth bag filling machines.

5-Star Plan in action. Plant surveys made by Union-Camp multiwall specialists paved the way for the major packaging savings described here.

That was only the beginning. By carrying the change-over one step further, and standardizing on *size* and *construction* of multiwall bags, the company would save another $22,000 a year.

1 Design Replaces 160

Next, Union-Camp's survey team analyzed the company's existing bag *designs*. They found there were about 160 designs being used. Here, again, standardization was recommended.

By creating one basic design, eliminating an expensive yellow outer sheet, and using the same printing copy for all bags, the company netted additional economies of $84,000 a year.

$30,000 plus $20,000 plus $84,000. Total annual packaging savings—$134,000.

$30,000 a year savings resulted from converting to sewn open-mouth multiwalls in company's six plants.

How Much Could You Save?

Hundreds of companies—large and small—reduce their multiwall packaging costs by taking advantage of Union-Camp's 5-Star Plan. This comprehensive service is free. It covers bag design, bag construction, specifications control, packaging machinery and a survey of your materials handling operation. An improvement in any one of these areas conceivably could result in substantial economies for you.

See your local Union-Camp man for complete details.

This basic bag design, now used for all Smith-Douglass brands, reduced company's multiwall costs by $84,000.

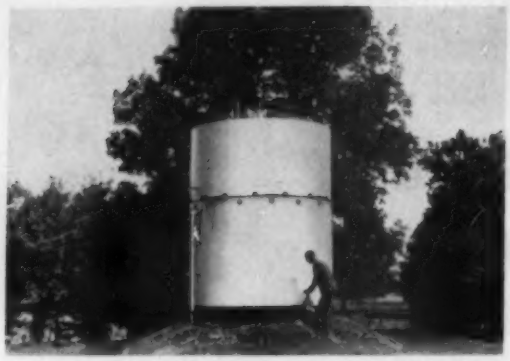
FREE 16-PAGE BOOKLET

Write Dept. M-4 today for a free copy of Union-Camp's new 5-Star Plan booklet. It describes many case histories showing how packers like yourself have achieved greater efficiency and economy in their multiwall packaging operations.

UNION-CAMP
MULTIWALL BAGS
Union Bag-Camp Paper Corporation 233 Broadway N.Y. 7, N.Y.

Enter 1111 on Reader Card

continued from page 214



Sewage treatment for small plants

Sewage treatment has become an urgent problem for many rock products producers in remote and outlying areas. This has been the result of greatly extended zoning regulations and the enforcement of stream pollution restrictions. For many producers now beyond the limit of regulations, the problem may arise in the near future.

Bio-Pac is one manufacturer's answer to the need for a compact sewage treatment plant that can economically serve as few as 50 people. It is a unit that is completely assembled at the factory and is shipped ready to be put into place. Eight sizes are offered to treat the waste from a population equivalent from 50 to 500 people. The installed cost per capita ranges from $240 for the smaller unit to $60 for the largest.

Once installed, the process is completely automatic. Only part-time personnel is needed for periodic inspection while digested sludges are removed once or twice a year. The two-stage system incorporates principles of industrial and municipal sewage treatment that are integrated into specially engineered installations. It meets the requirements of the "Ten States Standards for Sewage Works." The equipment maintains a uniformly stable effluent even under adverse operating conditions that is satisfactory for discharge into streams. (Link-Belt Co., Prudential Plaza, Chicago 1, Ill.)

Enter 102 on Reader Card

Electrical contact cleaner

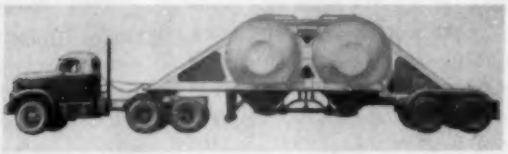
Cramolin-Paste is the name of a newly developed paste-type cleaner for electrical contacts. It is said to be particularly useful for maintaining and lubricating contact surfaces in high amperage and high voltage applications.

The new paste is easily applied to contact surfaces and thins out as it is wiped on. It adheres to contact surfaces and contact pressure merely makes a thinner film. The material does not contain mineral acids, alkalies or sulphur that would pit or attack metals. It works effectively down to minus 10 deg. C. and up to the drip-point at 46 deg. C. (Caig Laboratories Inc., 46 Stanwood Rd., New Hyde Park, N.Y.)

Enter 103 on Reader Card

Bulk transport trailer

A dry bulk trailer of revolutionary design is said to assure trouble-free operation and low maintenance. The new unit combines spherical vessels



with an advanced and highly efficient pneumatic system. The whole assembly is mounted on a lightweight trailer.

The spherical, all-welded vessels are made in 300, 340 and 400 cu. ft. sizes. The vessels and their conical bottom sections are free from protrusions that would hold material. Special liners are available to handle special materials. The units are suitable for handling bulk cement, lime, stucco, silica and other fine granular materials.

Semi and four-wheel trailers are offered to provide payload capacities up to 80,500 lb. A wide range of sizes is available to meet the highway restrictions of a number of states and to fit special applications. (Highway Trailer Industries Inc., 250 Park Ave., New York 17, N.Y.)

Enter 104 on Reader Card

Electrostatic precipitator

A new electrostatic precipitator features exceptional efficiency, modular construction and all-welded fabrication. The high efficiency is the result of an unusual flat collector plate with pockets that serve to trap and hold the dust against re-entrainment.

The flat plate design is said to have the advantages of improving the migration velocity of dust to the collecting electrode, reducing turbulence and improving rapping effectiveness.

Four types of high-voltage rectifier are offered, including selenium, silicon, vacuum tube or mechanical. Two types of control are available—a saturable reactor or a resistor type. (American-Standard Industrial Div., Detroit 32, Mich.)

Enter 105 on Reader Card

Please turn to page 218

1 year old

1-yard Marion backhoe stripping overburden.

6 years old

1½-yard Marion shovel has been loading limestone on a nine-hour shift, five days a week basis since 1954. Yet to experience any major downtime.

15 years old

¾-yard Marion crawler crane in dropball service. Still performing well without exceptional or major repairs.

A FAMILY OF MARIONS WORK THIS QUARRY

There are no magic formulas for this kind of dependability. Marions thrive on tough digging and general hard work such as is being experienced in this Virginia limestone quarry. As is true with all Marion excavators, they are designed on the philosophy that every job is a "tough one." And, performance figures on numerous quarrying operations around the world bear this out. How about you? Getting the kind of profit-making dependability you should expect — and deserve — from your excavating equipment?

MARION

MARION POWER SHOVEL COMPANY

MARION, OHIO • A Division of Universal Marion Corporation

Electronic particle size counter

Particle size distribution data may be obtained in seconds with a newly developed electronic instrument. With the rapid determination possible, the Model C counter may be used as a production control instrument to make size analyses of raw material slurries and finish mill outputs in cement plants, and of powdered lime, talc, silica and the discharge from dust collectors of all types. Particle range of the counter extends from below 1 micron to above 200 microns.

Within a 10-sec. counting period the Model C yields full size range data. Counts may be presented as "greater than stated size," or "between stated size." The maker states that there is high reproducibility, close tolerance statistical deviation and great reduction of human error. (Coulter Electronics, 2525 N. Sheffield Ave., Chicago 14, Illinois)

Enter 106 on Reader Card

Automatic scale cutoff

A new scale cutoff can be installed on virtually all scale dials without modification of the scale itself. This is said to be the latest answer to the problem of automatic scale cutoff of scale-operated machinery. Microset 606 can be operated by one man with a simple dial setting and a push button. A number of optional circuits are available to meet almost every scale requirement. (Cardinal Scale Mfg. Co., Webb City, Mo.)

Enter 107 on Reader Card

Automatic hardfacing for crushers

Crushermatic is the name of a newly developed device for hardfacing crusher rolls in position. It is said to be up to four times faster than manual welding and at least twice as fast as hand-held semi-automatic welding.

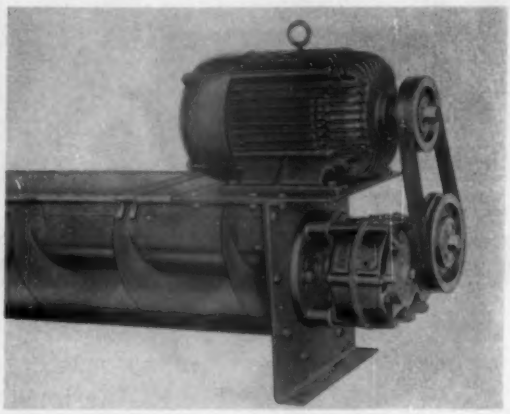
The new equipment consists of three separate units: a motorized carriage that rides a track suspended over the roll to be resurfaced; an electronic control system that provides the proper sequence for the circumferential and transverse welding beads; and a motorized reducer that rotates the crusher rolls at speeds suitable for hardfacing.

With these controls and equipment an unusual variety of welding patterns is easily set up. Build up may be confined to the worn area or patterns may be produced that increase crushing efficiency. Since the rolls are processed without removing them from their operating position, additional productive time is achieved while maintenance costs are greatly reduced. (Stoody Co., 11920 E. Slauson Ave., Whittier, Calif.)

Enter 108 on Reader Card

Drive for short screw conveyors

A new, low-horsepower drive is available for short screw conveyors from 6 to 20 in. diam. This compact unit combines a reducer with a thrust bearing, packing gland and drive shaft. The entire drive may be removed from the trough end without disturbing the conveyor, while the drive shaft may be removed from the reducer without dismantling it.



The new drives are identified as Series 100 and extend the manufacturer's line of screw conveyor drives into the low horsepower end of the line. It is now possible to select a motor and reducer for a short cross conveyor or feeder to match the small horsepower required.

Two speed ratios are now available: the CD108 at 8 to 1 reduction, and the CD118 giving 18 to 1. Any desired output speed may be achieved by selecting an appropriate V-belt drive from the motor to the reducer. (Dodge Mfg. Corp., Mishawaka, Indiana)

Enter 109 on Reader Card

Please turn to page 220

ONLY DRACCO CAN OFFER

sonic cleaning

(patented)

the most modern and efficient method for removing dust from glass-bag dust collectors

Dracco dust collectors now utilize one of industry's most exciting new techniques — *sonics* — to realize greatly improved glass filter bag cleaning action. This development is so significant that you should not specify or buy another dust control unit until you get the full story on sonic cleaning.

Sonic cleaning — patented and available exclusively from Dracco — provides three operating advantages: *low back pressure* through effective dust removal; *long bag life* since bags are not flexed, creased or shaken; *low maintenance* through elimination of moving parts within the collector.

Cleaning by low-frequency sound waves has been conclusively proved in full-scale field installations:
. . . on Glass-Bag Filters it is distinctly superior to reverse air cleaning alone.
. . . on conventional baghouses using cotton or synthetic bags it provides results second only to mechanical shaking. While mechanical shaking offers more vigorous bag agitation, sonic cleaning provides satisfactory cleaning with less bag wear and no internal moving parts.

Sonic cleaning is recommended for cement mill applications (kilns, grinding, classifying, materials handling), electric and open hearth steel furnaces, metallurgical furnaces, rock dryers, calciners, fusing furnaces, chemical processes and related applications.

You can get further information on Dracco sonic cleaning and expert consultation on your dust control requirements from: Dracco Division of Fuller Co., Harvard Avenue & East 116th Street, Cleveland 5, Ohio.

Proved in service — Dracco Glass-Bag Filter equipped with sonic generators cleans cement kiln gases. Sound waves dislodge collected dust without wear or fracture of cloth.

DRACCO *airstream* conveyors
dust control equipment

FULLER COMPANY GENERAL

Enter 1115 on Reader Card

Kiln chains

A new line of kiln chains has been introduced after testing in a wide variety of operating conditions in portland cement kilns. Two types are offered in three styles to fit into any existing chain system.

One type is a specially alloyed steel chain that provides exceptional resistance to the abrasion and high temperatures at the hot end of the chain system.

The other type is a carbon steel chain that gives its best service in the center of the chain section where operating conditions normally do not require alloy steel chains.

Both types are offered in a number of sizes of Proof chains, along with fittings and accessories to fit existing chain systems. For orders of 20,000 lb. or more, both types of the new chains can be made in BBB and Passing Link styles. (Campbell Chain Co., 415 Norway St., York, Pa.)

Enter 110 on Reader Card

Portable conveyor

Hydraulic controls on a new portable conveyor permit one-man operation. The hydraulic mechanism has a total stroke of 17 ft. This permits one man to raise or lower the conveyor at will.

The conveyor itself has a standard 18-in. wide belt running in a steel troughing plate. The unit is available in lengths from 20 to 50 ft. in 5-ft. increments, and the unit can be supplied in other standard belt widths. Gasoline engines or electric motors drive each unit. Optional features include loading and discharge hoppers and a 4-wheel towing dolly. (Finco, Inc., 525 Rathbone Ave., Aurora, Illinois)

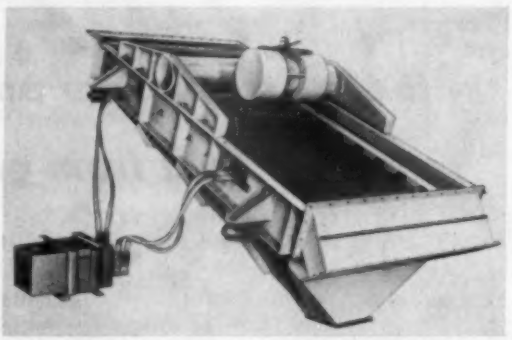
Enter 111 on Reader Card

Anti-dusting compounds

Stock piles of fine materials in the rock products industry can be protected from loss with a newly developed spray, Compound SP-301. This material forms a thin, tough and durable crust that is highly resistant to weathering. The compound is nontoxic, inert and has no effect on the properties of most fine materials. It can be used effectively to prevent loss of valuable fines by wind or erosion as well as to prevent problems arising from dusting or air pollution. (The Johnson-March Corp., Philadelphia, Pa.)

Enter 112 on Reader Card

Heated screens



This manufacturer's line of vibrating screens now comes with factory-assembled electric cloth heaters. Screen blinding when handling troublesome damp fines is eliminated with the use of a low-voltage secondary transformer that assures constant, uniform heating of the cloth.

Seven models of the RV series of vibrating screen can be supplied with the heating mechanism, including double-deck units between 3 x 5 ft. and 6 x 14 ft. (Syntron Co., 450 Lexington Ave., Homer City, Pa.)

Enter 113 on Reader Card

New oiling system

This manufacturer's line of jaw crushers is now available with a compact, self-contained oiling system. This assures that the crusher will not break down from either over- or under-oiling. The machine runs cooler as the bearings get just the right amount of lubrication.

The oiling system includes oil tank, pump, motor and oil lines. Fresh filtered oil is pumped to the crusher bearings and returned to the filter through flexible hoses. Even under the severest operating conditions the oil needs to be changed only every 1,000 hr. or every 4 months of operation. (Smith Engr. Works Div. of Barber-Greene Co., P.O. Box 723, Milwaukee 1, Wis.)

Enter 114 on Reader Card

Please turn to page 222

NEW PRODUCTION RECORDS SET

ONE MILE UNDERGROUND

Trojan 304, with *exclusive* curved-nose rock bucket, speeds loading operations for Peerless Quarries, Inc. Kansas City, Kansas

"With the kind of production we're getting, we are sold on Trojan," says S. A. Miller, general superintendent of Peerless Quarries. After comparing other machines, Peerless picked a Trojan 304 with exclusive curved-nose rock bucket to load blast-crushed limestone deep underground. Low mine ceilings presented a clearance problem in loading high, side-boarded trucks — Trojan's greater loading reach solved it. Mr. Miller further states, "Our Trojan 304, with its special rock bucket gets penetration under load. It is not necessary to crowd hard enough to spin the wheels. Most other loaders have to go into the pile much faster to fill the bucket — not Trojan. This fact alone has resulted in our having spent only eight dollars for maintenance in better than six months operation. Loading an average 1500 tons of limestone daily, we've eliminated an hour overtime for each operator by buying Trojan." Trojan's easy loading features mean high production. Call your Trojan distributor for a date—today! He'll show you Trojan's performance data that proves lower costs, longer life and trouble free operation with a demonstration on your job.

44-32

TROJAN®
TRACTOR SHOVELS
YALE & TOWNE

THE YALE & TOWNE MANUFACTURING COMPANY
TROJAN DIVISION • BATAVIA, NEW YORK

Conveyor frames

Increased strength, accurate alignment and great rigidity are features of a new line of lattice-frame conveyor supports. These are pre-engineered, standardized conveyor components which require only a minimum of field erection time to assemble.

Deep trusses with heavy bracing increase conveyor strength without additional weight and increase resistance to external stresses. Part of the extra strength is achieved with the elimination of bolt holes that usually reduce the strength of individual steel members. Hook bolts are used to secure motor mounts, walkways and skirtboards.

In addition, troughing rolls are clamp-mounted to step-up assembly speed and improve belt training. All idlers are lubricated and sealed at the factory. They don't need lubrication in the field.

Strigid conveyor frames are offered in standard widths for 18, 24, 30 and 36-in. belts and in lengths varying by 2-ft. increments. These standard units can be assembled to make portable, semi-portable or stationary conveyor systems. (Iowa Mfg. Co., Cedar Rapids, Iowa)

Enter 115 on Reader Card

Moisture determination

A new hand-size instrument will permit the rapid, accurate determination of moisture in fine granular materials. The sample to be tested is placed in an aluminum container and the hygrometer is inserted. After about 20 min. this instrument will indicate the relative humidity of the sample. The absolute moisture of the material is determined from a set of tables of humidity equilibrium. (Abrax Instrument Corp., 179-15 Jamaica Ave., Jamaica 32, N.Y.)

Enter 116 on Reader Card

RP BUYER RESEARCH SERVICE
PRODUCER PURCHASING SERVICE *FREE*

QUICK—COMPLETE SOURCE CONTACTS FOR ROCK PRODUCTS PRODUCERS on Machinery—Equipment—Supplies—Service

___Aftercoolers, Air
___Agitators
___Aggregates (special)
___Air Compressors
___Asphalt Mixing Plants
___Bagging Machines
___Bags
___Barges
___Belting, Conveyor
___Elevator, Power Transmission
___Belting, V-type
___Belt Repair Equipment
___Bin Level Indicators
___Bins and Batching Equipment
___Bits
___Blasting Supplies
___Bodies, Trailer
___Buckets
___Bulldozers
___Cars, Industrial
___Classifiers
___Clutches
___Coal Pulverizing Equipment
___Concentrating Tables
___Conveyors
___Crushers
___Coolers
___Cranes
___Derricks
___Dewatering Equipment, Sand
___Diesel Engines
___Dragline Cableway Excavators
___Draglines
___Dredge Pumps
___Drilling Accessories
___Drills
___Dryers
___Dump Bodies
___Dust Collecting Equipment & Supplies
___Electric Motors
___Engineering Service Consulting and Designing
___Explosives & Dynamite
___Fans and Blowers
___Feeders
___Fifth Wheel Heavy Duty Special
___Flotation Equipment
___Front End Loaders
___Gasoline Engines
___Gear Reducers
___Generator Sets
___Grinding Media
___Gypsum Plant Machinery
___Hard Surfacing Materials
___Hoists
___Hoppers
___Kilns: Rotary, Shaft, Vertical
___Locomotives
___Lubricants
___Magnetic Separators
___Mills
___Pipe
___Pumps
___Scales
___Screen Cloth
___Screens
___Scrubbers: Crushed Stone, Gravel
___Shovels, Power
___Speed Reducers
___Tanks, Storage
___Tires and Tubes
___Torque Converters
___Tractor Shovels
___Tractors
___Trailer Dump Bodies
___Trucks, Bulk Cement
___Trucks, Industrial
___Trucks, Mixer Body
___Trucks, Motor
___Valves
___Vibrators
___Welding and Cutting Equipment
___Winches
___Wire Cloth
___Wire Rope

If equipment you are in market for is not listed above, write it in space below.

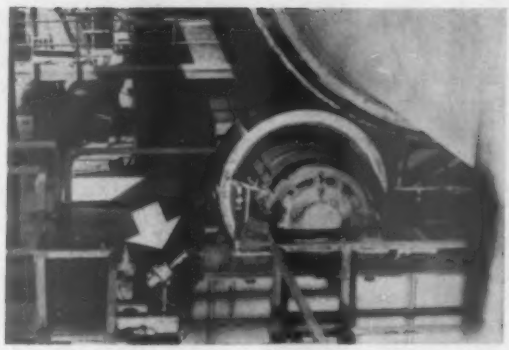
The principal rock product(s) manufactured by my company is/are indicated "1", "2", "3", in order of importance below.
___Crushed Stone
___Sand & Gravel
___Slag
___Cement
___Lime
___Gypsum
___Ready Mix Concrete
___Concrete Products Type_____
Other nonmetallic mineral (What?)_____
All above information is strictly confidential to be used to guide the manufacturers in supplying proper information.

Please Check Service Desired
☐ Have Salesman Call ☐ Literature only
☐ Prices ☐ By mail ☐ Urgent

NOTE: See—Where to Buy-Classified Advertising Section for used equipment and complete plant information

Name _____
Title _____
Firm _____
Street & No. _____
City and State _____
Your Signature _____ Title_____

FILL IN—TEAR OUT—MAIL NOW! *BUYER RESEARCH SERVICE DEPARTMENT:* ROCK PRODUCTS 79 W. Monroe St. Chicago 3, Illinois



Pivoting pyrometer

Rayoscan is the name of a new pyrometer that continuously scans the shell of a rotary kiln through an arc of 85 deg. At the same time, it continuously records the temperatures and signals the presence of a potential hot spot. This advance warning often enables the operator to take preventive measures without stopping production.

The package consists of an easily installed scanning unit that includes a highly sensitive heat radiation pyrometer and a small drive unit. The whole package can be mounted at any convenient place around the kiln—above, below or beside it.

Temperatures detected are recorded on a strip chart in the operator's panel. Since the shell temperature between 200 and 1,000 deg. F. is continuously recorded, the instrument can be used as a process control tool as well as a safety device. (Leeds & Northrup Co., 4901 Stanton Ave., Philadelphia 44, Pa.)

Enter 117 on Reader Card

Soil stabilizer

Kompactor is a new chemical that can assure that heavy-duty haul roads will remain passable in all weather. At the same time, it can be used on roads, parking lots and open areas to reduce dusting.

The new chemical compound is non-toxic and leaves no residues harmful to plants, trees or animals. Yet, it is so powerful that its normal dilution is 1 gal. per 1,000 gal. of water. This amount will treat between 5,000 and 10,000 sq. ft. with optimum results attained for most applications on about 6,000 sq. ft.

In addition to its prime uses on haul roads and dust suppression, the chemical is equally effective to control dust on secondary roads, to stabilize subbases before paving and to treat aggregates. (The Central-Reynolds Co., Fresno, Calif.)

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Please turn to page 224

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LIME . . . CEMENT KILNS

VULCAN OF WILKES BARRE CAN DESIGN & MANUFACTURE JUST THE TYPE YOU NEED

All equipment made by Vulcan must measure up to the standard of quality and responsibility it has taken 111 years to earn. Contact Vulcan today . . . estimates, constructive suggestions and preliminary drawings will be furnished (as far as possible) without obligation.

VULCAN IRON WORKS INC.

Wilkes-Barre, Pa. Cable Address: Vulworks

"The Oldest Name In Rotary Kilns."

ROTARY KILNS, COOLERS, DRYERS, RETORTS, CALCINERS, VERTICAL LIME KILNS, BRIQUETTING PRESSES, ELECTRIC HOISTS, SHEAVES, SUGAR MILLS, EDGE RUNNERS

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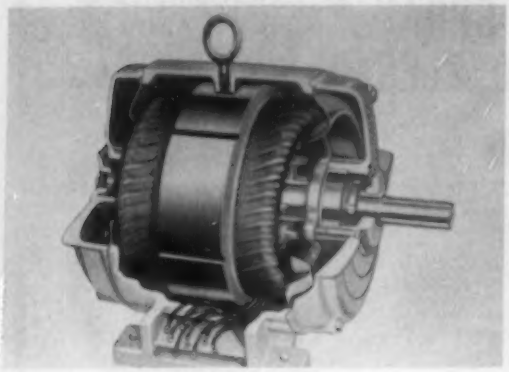

Encapsulated motor

Open and drip-proof motors now can have extra protection when used in the high-moisture or abrasive atmospheres of the rock products industry. This manufacturer's line of random-wound ac. induction motors can now be supplied with encapsulated stators.

Heat-resistant plastic fills all the voids between the wires in the stator slots and completely seals the end coils with a moisture-proof, chemical-resistant protective sheath. The protective material has high dielectric strength and exceptional resistance to heat deterioration.

The new encapsulated protection is offered on the maker's open and drip-proof motors up to 125 hp. at 1,800 rpm., in standard voltages up to 600 v. (Louis Allis Co., 427 E. Stewart St., Milwaukee 1, Wisconsin)

Enter 119 on Reader Card

Plastic chute liners

Plastics are finding wider use in the rock products industry as their unusual properties become better recognized and as more users learn to work with them.

Typical of these new applications is a fabric-backed urethane, called PO-663. Used as a liner on pipes, chutes or bins, it protects the steel from abrasion and impact of sand, gravel, crushed stone, coke, slurries, glass and other abrasive materials.

The fabric-backed plastic is quickly and easily applied to steel with standard adhesive resins. It can reduce the cost of steel work by permitting the use of thinner gauge materials and lighter structural supports. Maintenance expenses are reduced since the lightweight plastic sheets are readily replaced.

PO-663 is available in standard stock sheets from 12 x 20 in. up to 40 x 96 in., and in thicknesses of $\frac{1}{16}$, $\frac{1}{8}$ and $\frac{1}{4}$-in. (Armstrong Cork Co., Liberty & Charlotte Sts., Lancaster, Pa.)

Enter 120 on Reader Card

Stainless hard-facing wires

Composite stainless steel hard-facing wires are now available for automatic and semi-automatic hard facing. These tubular wires are obtained by regulating alloy mixtures with a given quantity of steel strip. These wires can be deposited by metal arc, tungsten arc and submerged arc processes. The new wires are available in 5 wire diameters between $\frac{3}{32}$ and $\frac{1}{8}$ in. diam. in spools, coils or reels. (Stoody Co., Whittier, Calif.)

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Open gear lubricant

Open gears can now be properly lubricated without messy buckets of grease tediously applied with wooden paddles. Instead, gear lubricant can be applied with a pressurized spray. This technique is not only more convenient, but it saves grease as it reaches inaccessible gearing. Each pressurized container weighs just a pound. (Spray Products Corp., P.O. Box 1988, Camden 1, N.J.)

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END

PROBLEM:
Excessive downtime for thrust roller maintenance
SOLUTION:
Bethlehem-designed heavy duty thrust idler assembly
Rugged, yet compact, effectively controlling what was once an unruly kiln. If you have a thrust roller problem, Bethlehem's IMPROVEMENT ENGINEERING followed up by manufacturing know-how can give you the efficient, economical solution.
BETHLEHEM
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225 W. SECOND STREET, BETHLEHEM, PA.
CEMENT MILL MACHINERY DIVISION
OTHER BETHLEHEM PRODUCTS: CHEMICAL PROCESS EQUIPMENT, ENVIRONMENTAL ENGINEERING EQUIPMENT, SPECIAL MACHINERY, AUTOMATIC HEATING EQUIPMENT; FOUNDRY, FABRICATION AND MACHINE SHOP SERVICES.

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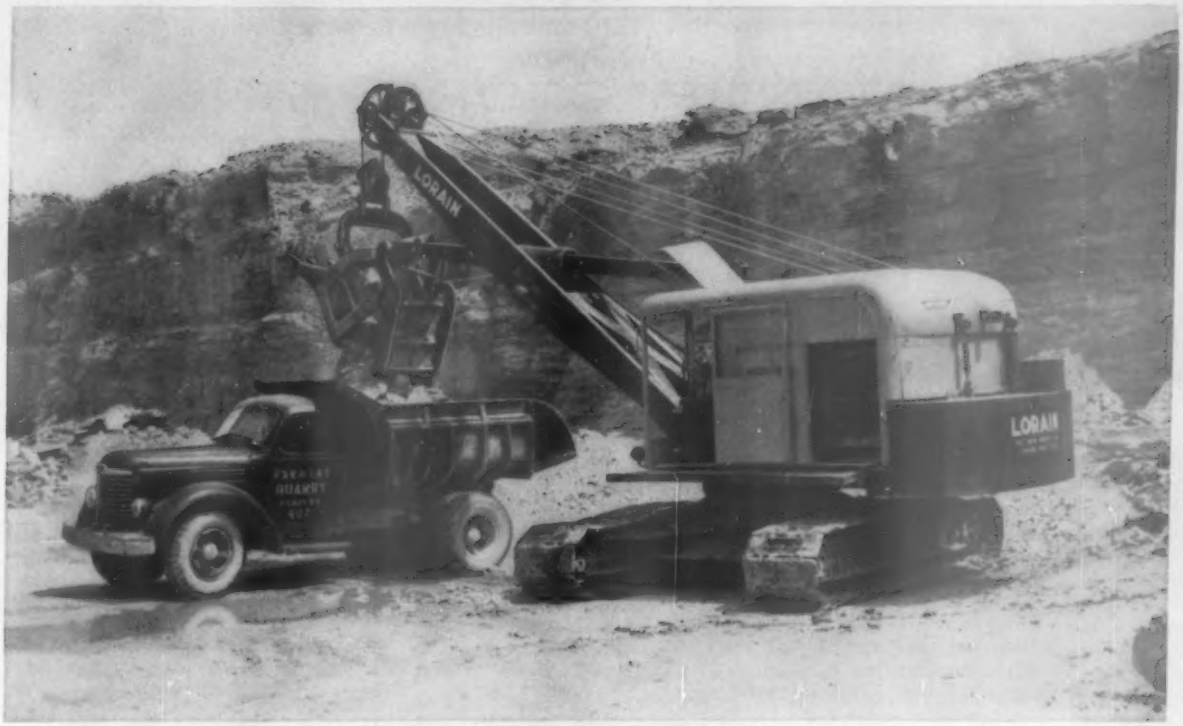

When you want more than a 'Rock Shovel'

Digging rock has always been the standard test for shovel ruggedness. But just digging rock is not enough these days. Any lumbering, slowed down shovel can dig rock. It takes modern high speed production to dig rock at a cost on which a profit can be made.

Lorain shovels are designed on this basis. Take the 1¼-yard Lorain-56 for example. It's sturdy, it's fast and has exclusive features that enable it to pay off on today's profit squeezing operations.

Joy-stick Controls. Only 2 levers are needed to "feed" metered air-power to all turntable clutches for the easiest, smoothest, most co-ordinated operation. It's easier on the operator—easier on the machine—boosts production.

Shear-Ball® Turntable Mounting. The superstructure is held to the crawler and revolves freely and smoothly on a huge ball bearing of hardened steel balls sealed in precision ground and hardened steel races. The constant adjustment, maintenance and lubrication problems of roller type mountings are gone forever. Think how this eliminates down time, increases production. Shear-Ball is guaranteed for 10 years.

There are many more reasons why you should buy Lorains for rock digging. Why not see your Lorain distributor today for the full story.

THE THEW SHOVEL COMPANY, LORAIN, OHIO

LORAIN®

DOES MORE FASTER • FOR LESS

PLANTS in Lorain and Elyria, Ohio.
PRODUCTS—Power shovels, cranes, draglines, clamshells, and hoes on crawlers from ⅜- to 2½-yard capacity • Cranes from 7 to 80 tons . . . on crawlers, and as rubber tire Moto-Cranes, and Self-Propelled Cranes • Rubber tire front-end Moto-Loaders in 6,000-lb., 7,000-lb., and 9,000-lb. operating capacities.
OUTLETS—Lorain products sold and serviced by 249 distributor outlets throughout the world.

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MANUFACTURERS NEWS

Experimental rotary kiln

RECENTLY, a calcining, roasting and sintering plant was added to the experimental processing department of Miag (with American headquarters at Minneapolis, Minn.) in order to enable the company to carry out major tests concerning all processing problems such as the burning of cement, roasting and sintering processes. Part of the test results serve as basic values for the projection and planning of high capacity plants making use of special processes.

The Miag experimental plant corresponds practically to a complete cement works. The rotary kiln proper has a length of 30 ft. A Miag grate preheater with facilities for a double circulation of the material is part of the process. The roasted or sintered product is cooled and thermically utilized in a Fuller cooler. The burner for gas or oil or a mixture of gas and oil can be adjusted to various different processes.

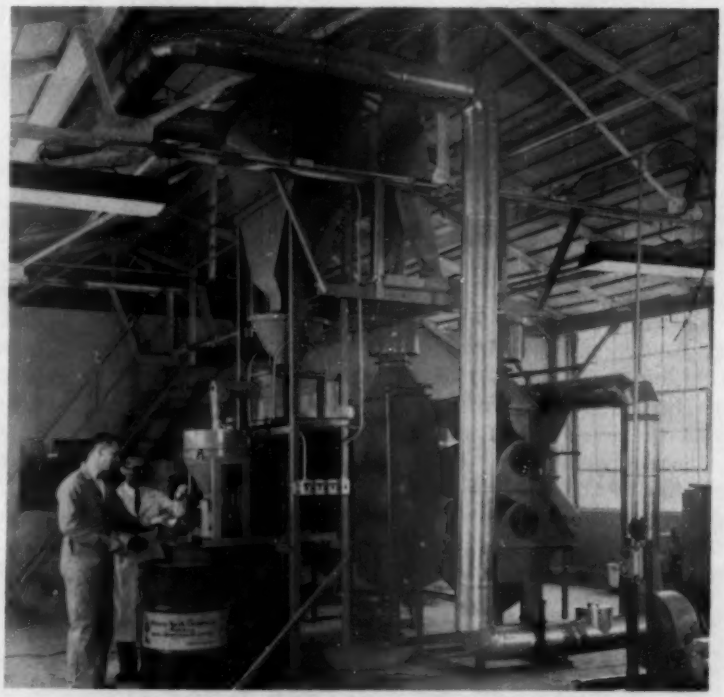
Manitowoc Shipbuilding develops cement industry products

INCREASED EMPHASIS on the development of newer and better products for the cement industry has been announced by Manitowoc Shipbuilding, Inc., Manitowoc, Wis. A subsidiary of The Manitowoc Co., Inc., the firm has been active in the design, manufacture and marketing of cement processing machinery since the early 1900's. Included in the company's growing line of equipment serving this market are lime kilns, recuperators, agitators and other heavy equipment.

American Cyanamid Co. awarded gov't. contract

A GOVERNMENT CONTRACT covering the investigation, development, synthesis and production of experimental quantities of high-energy explosives has been awarded to American Cyanamid Co., New York, by the Bureau of Naval Weapons. The contract award was announced by B. R. Putnam, Jr., who is manager of the company's explosives and mining chemicals department.

To perform this work, the company is building a new, small-scale pilot plant and associated facilities at its explosives plant in New Castle, Pa. Specially designed for high-energy materials, the plant will be suitably barricaded and isolated to ensure safe operation. Supervizing the company's program on high-energy material will be Dr. J. H. Paden, director of research for the Organic Chemicals Div., and L. V. Clark, director of explosives research.



New testing facility for Johnson-March Corp.

THE JOHNSON-MARCH CORP., Philadelphia, Pa., has opened a new testing facility for the analysis of problems associated with the addition of liquids to solids on a continuous basis. In dedicating the new facility, Edward P. Frankel, president, said, "This will enable Johnson-March customers to witness the addition of precise amounts of liquids to their dry materials. Previously, all material analysis and treatment had to be conducted in the chemical laboratory at our main plant which, unfortunately, is not equipped to handle many visitors . . ."

The new testing facility will be of interest to any process industry faced with the problem of adding a precise amount of liquid to a dry material.

Please turn to page 228

Dundee Cement Co., Dundee, Michigan

This PLYMOUTH moves *6 million barrels* of cement a year

Designed for an ultimate production of 6 million barrels of cement per year, the ultra modern Dundee Cement Company relies on this 40 ton Plymouth Torqomotive to handle its rail shipments, which comprise the bulk of this production. In addition, 600 tons of coal per day are handled inbound.

Howard Emerson, Dundee's Shipping Supervisor, says, "I've seen our Plymouth pull as many as 19 loaded hoppers at a time. It handles a normal 10-car load with ease."

George Everett, Jr., the man who runs the Plymouth at Dundee says, "This Plymouth is an easy operating locomotive. All the controls are at your fingertips. . .when you give it the power, it moves out — now!"

Plymouth Locomotives are available from 3 to 100 tons, Diesel or gasoline, chain or shaft drive with full power shift transmissions. Let Plymouth engineers recommend the size and model that fits your needs, no obligation of course.

Plymouth Locomotive Works, Division of The Fate-Root-Heath Company, Dept. A-5, Plymouth, Ohio

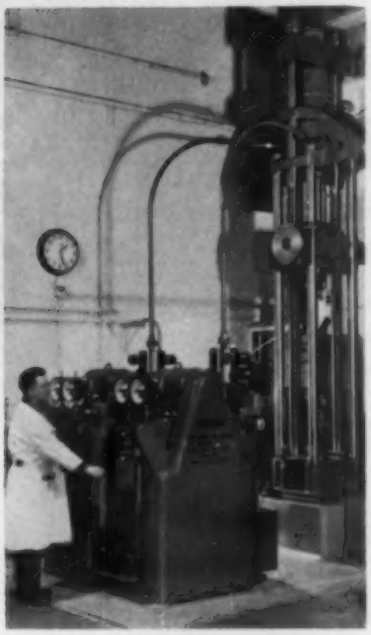
PLYMOUTH® LOCOMOTIVES

WITH TORQOMOTIVE DRIVE

RAIL POWER

PLYMOUTH LOCOMOTIVES in Progressive Industry throughout the world

continued from page 226



100-ton fatigue test machine installed at Chain Belt Co.

THE RECENT ADDITION of a new, 100-metric ton, fatigue testing machine to its Milwaukee research center facilities has been announced by Chain Belt Co. The new unit, a Swiss-made Amsler, is claimed to provide the firm with the largest fatigue testing device in the chain manufacturing and construction machinery industries. This machine furnishes Chain Belt with the capability of conducting a broad range of stress endurance tests. The company can now test chains ranging from one thousand to over one million pounds in ultimate strength.

The unit is a hydraulic machine which is operated with the aid of two pulsators. The pulsators regulate the stroke of the machine by pumping oil to a jack which is mounted on the machine proper. The machine accommodates a maximum dynamic load of 220,000 lb.; is electrically driven, and operates at 300 to 600 cycles per min. Chain Belt is presently using the machine to test the fatigue strengths of its heavy, larger-pitch chains as well as to cycle them throughout their fatigue life.

Chromalloy acquires Shunk

SHUNK MFG. CO. announced its acquisition by Chromalloy Corp., New York City. Purchase of the privately owned firm was made for an undisclosed amount of Chromalloy stock. It will be operated as a wholly owned subsidiary of Chromalloy, under the presidency of Raymond W. Burman, the present chief executive of Shunk. Mr. Burman will also become a director of the parent company.

Shunk is a manufacturer of replaceable blades and cutting edges for earthmoving, road construction, road maintenance and snow plow equipment. The two companies complement each other since Chromalloy specializes in the development and production of diffusion metal coatings and alloys with resistance to corrosion, heat and wear. Chromalloy metallurgists and Shunk engineers will collaborate in the production of improved metal products.

Miller & Plumb re-elected

AT THE ANNUAL MEETING of the CIMA Bituminous Equipment Manufacturers Bureau in Houston during the National Bituminous Concrete Association Convention, W. F. Miller, vice president-sales manager of Hy-Way Heat Systems, Inc., Youngstown, Ohio, was re-elected chairman for 1961. Robert F. Plumb, assistant sales manager of Iowa Mfg. Co., Cedar Rapids, Iowa, was also re-elected vice chairman to serve with Mr. Miller.

The Bituminous Equipment Manufacturers Bureau, sponsored by the Construction Industry Manufacturers Assoc., is another in the growing list of groups now organized by CIMA members wherein manufacturers of like equipment may meet to discuss mutual problems, report business statistics, promote the use of their products and services, or embark on any mutually agreed upon programs that would be beneficial to the industry.

Sheet & Tube sells Johnston Pump Co. to Can. Fairbanks-Morse

YOUNGSTOWN SHEET & TUBE CO., has sold Johnston Pump Co., of California, a subsidiary of one of its divisions, to Canadian Fairbanks-Morse Co., Ltd. Johnston Pump is a maker of vertical pumps in Pasadena, Calif., and has a Mexican subsidiary. Canadian Fairbanks-Morse, headquartered in Montreal, manufactures scales, valves and other products.

Robert H. Morse, III, president of the Canadian company, said acquisition of Johnston Pump will give his company an entry into the U. S. pump market, an additional source of pumps to sell in Canada and an opportunity to increase its activity in world export markets.

New plant to be built for W. S. Tyler Company

A CONTRACT—in excess of $5 million—for the construction of a new manufacturing plant for the W. S. Tyler Co., Cleveland, Ohio, has been awarded to the George A. Fuller Co., New York. The announcement was made jointly by E. T. Jeffery, president of Tyler, and Ray C. Daly, Fuller president.

The new one-story, steel-frame structure will be located on a 118-acre tract in the Mentor Industrial Park, 25 miles from Cleveland. Providing more than 500,000 sq. ft. of manufacturing space, the new plant will produce heavy-gauge wire cloth and vibrating screen machinery for industrial and mining purposes. The plant, scheduled for completion in June, 1962, will employ approximately 400 people.

Please turn to page 230

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BUCYRUS-ERIE COMPANY, South Milwaukee, Wisconsin

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NOTICE

to all ROCK PRODUCTS and CONCRETE PRODUCTS subscribers and prospective subscribers

We have been informed that a Mr. Thomas Kelly has been representing himself illegally as being affiliated with ROCK PRODUCTS or CONCRETE PRODUCTS magazines. It is also believed that he may have used the name of Tom Ryan. We've had reports that he sells subscriptions to both magazines.

In the knowledge of the present publisher, this Mr. Kelly is not now nor never has been associated with ROCK PRODUCTS magazine or any of its affiliated publications. Under no circumstances should he be given cash or a check for a subscription. If he presents himself as a representative of either magazine, please call us collect immediately at RAndolph 6-2802 in Chicago, Illinois.

ROCK PRODUCTS 79 W. Monroe St., Chicago 3, Ill.

MANUFACTURERS NEWS

continued from page 228

Deister president dies

THE DEISTER MACHINE CO., Fort Wayne, Ind., has announced the death of its founder and president, Emil Deister, Sr. Mr. Deister was 88 years old. Born in Germany, he came to Fort Wayne 77 years ago. He has been granted a large number of patents covering improvement in separating equipment, especially ore concentrating tables and coal washing machinery. For these accomplishments in the concentration of ores, he is known throughout the mining world. Mr. Deister founded the Deister Machine Co. in 1912. He was active in company affairs until a few weeks before his death.

He is survived by his widow, Mrs. Caroline Deister, and two sons who have been associated with him in the company for many years, Irwin Deister, Sr., vice president and Emil Deister, Jr., secretary-treasurer.

Fuel cell demonstration kit

A FUEL CELL DEMONSTRATION KIT that produces electricity from chemical reactions is now available from the Allis-Chalmers Mfg. Co., Milwaukee, Wis. The company developed this first fuel cell demonstration kit in response to requests in view of limited text material on this subject. Full teaching information is included. Requests were received after the company demonstrated the first research vehicle in the world powered by electricity from self-contained and controlled fuel cells. Patent applications are pending on the company's improvement in the fuel cell field. The kit will produce electricity sufficient to operate a 1½-v. motor for about 15 min. on one fueling.

Conveyor film

THE ROLE OF THE CONVEYOR in modern America is featured in a new 16mm-sound film just released in full color. Titled "It's Your Move," the film runs 24 min. and demonstrates the importance of the conveyor in saving time and making work easier. Shown are conveyor systems in a variety of applications. Their use is illustrated in transportation, distribution, agriculture and manufacturing. The film emphasizes that standardization and continuous flow of materials are fundamental to the system of mass production in America. Good planning today requires that plants be built around the conveyor, and examples of such planning appear in the film.

The movie is being sponsored by the Conveyor Equipment Manufacturers Association and is being distributed by Modern Talking Picture Service, Inc., New York City.

H-R personnel changes

SEVERAL IMPORTANT CHANGES in the management of Hewitt-Robins Inc., Stamford, Conn., have been made:

Eugene F. Emmons was elected a member of the board of directors. Mr. Emmons is president of the Union Chain Div. of Hewitt-Robins. H. M. Ross was elected a vice president with responsibility for the company's contract engineering operations in this company and abroad. He will be assisted by Martin Vander Laan, who has been named director, engineering sales. Norman M. Godfrey has been appointed to succeed Mr. Ross as manager of operations, Robins Conveyor Div. Arley J. Ball was named Mr. Godfrey's successor as sales manager, eastern region.

Oliver appoints Beatty manager, Industrial Div.

OLIVER CORP., Chicago, Ill., has re-established and strengthened its construction equipment sales organization as a separate Industrial Div. and has named S. F. Beatty manager of the division, it was announced by S. W. White Jr., Oliver president.

Mr. Beatty will work directly with Donald W. Koegle, Oliver vice president—marketing, and President White, who is former vice president of the Industrial Div.

Dr. O. G. Lellep receives Carl Lueg Memorial Medal

DR. O. G. LELLEP, engineering consultant to Allis-Chalmers Mfg. Co., Milwaukee, Wis., processing machinery department, has been awarded the Carl Lueg Memorial Medal by the German Society of Iron & Steel Engineers in recognition of his pioneering work in applying oxygen to the production of steel.

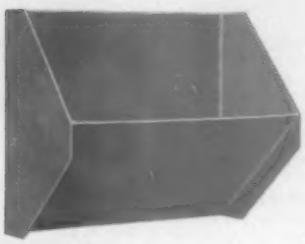
Mr. Lueg was a prominent founder of steel plants and steel-making processes in Germany early in the 20th century. The medal is awarded at rare intervals to persons who have made an outstanding contribution to the steel industry.

Most of Dr. Lellep's early development effort with the steel-making process he pioneered, dates from the period 1936-40 when, as a free-lance inventor in Germany, he conducted numerous experiments which laid the groundwork for his successful oxygen process. Allis-Chalmers obtained the services of Dr. Lellep in 1949 and, at the same time, worked out a licensing agreement with him for the use of certain of his patents in the company's research on a cement-making process.

END

STANDARD METAL
ELEVATING
AND
CONVEYING
EQUIPMENT

... Engineered for quality and long life

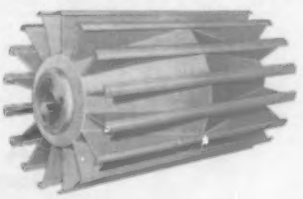


CONTINUOUS ELEVATOR BUCKET STYLE #2.

Available also in Salem, Style "A" and other continuous style buckets.

DUPLEX BIN GATE.

Single Bin Gates also available.



WING-TYPE SELF-CLEANING PULLEY

Dodge Taper-Lock® Hubs and Bushings standard. Available also with solid hubs bored to specifications.

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You may find just what you're looking for in the used equipment, employment and professional advertisements below. Box numbers are confidential and advertisers' names will not be disclosed. Send replies to: Box Number (shown on ad), c/o ROCK PRODUCTS, 79 W. Monroe St., Chicago 3, Ill. All replies will be forwarded to advertisers daily.

CEMENT PLANT HANDLING & CRUSHING EQUIPMENT

BLOWERS
1—12-20 Sutor bilt Rotary Positive Press.
1—22"x38½" Roots Rotary Positive, 150 HP, 220 V.
1—#6, Size 20"x36" Roots Rotary Positive, 150 HP

CLASSIFIERS
2—60"x20' Akins Spiral, std. weir, 5 HP
1—3" Corrclone, VRC
1—EE10-4B Krebs Cyclone
1—4' x 15' Dorrco Duplex Rake, DSFM.

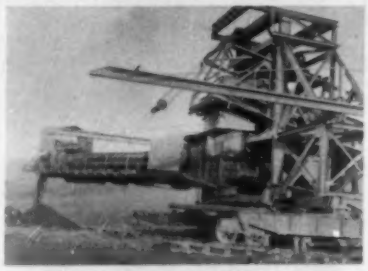
COMPRESSORS
2—1528 cfm Joy Mod. WN114E, 300 HP, 2400 V
1—475 cfm Joy WG-9 12x9, 80 psi
1—2500 cfm Sullivan Class WN4, 2200 Volt

CONVEYORS
1—60"x150' Conveyco, Lattice Frame 100 HP
1—42"x1250' Link Belt, Steel Frame 2-100 HP
1—36"x645' Link Belt, Steel Frame 2-100 HP
1—42"x870' Link Belt, Steel Frame 100 HP
1—30"x490' Jeffrey, 52H, Steel Frame 15 HP
1—30"x450' Jeffrey, 52H, Steel Frame 15 HP
1—30"x200' Jeffrey 52H, Steel Frame 15 HP
1—30"x350' Jeffrey, 52H, Steel Frame 15 HP
1—48"x22' Steel Frame, 5 HP. Schrock
1—60"x30' Hewitt Robins, 40 HP.

CRUSHERS
2—4' Symons Std. Cone, Fine bowl, 125 HP 440 V
1—4' Symons Std. Cone, Coarse bowl
1—15"x24" Traylor Bloke Type Jaw 40 HP 440 V.
1—30"x42" Pioneer, Steel Frame, RB, 125 HP, EXC.
1—10"x30" Pacific Jaw, 40 HP
1—60" Pennsylvania Single Roll.

DREDGE
1—6 cu. ft. Yuba, Electric, Year 1954

FEEDERS
1—36"x15' Link belt, Steel pan 3 HP
1—30"x13' Sliding belt, 1½ HP. Excellent
8—8"x36" Jeffrey vibrating 2DH. 110 V.
2—10"x36" Jeffrey vibrating 2AHD 110 V.
1—30"x60" Syntron vib. F45A, 440 V.
1—GF-22-24 Syntron "Gravimetric"
1—30"x48" Jeffrey Vib. 4H, 440 V.
1—24"x72" Jeffrey Vib. 4H, 440 V.
1—24"x72" Jeffrey Vib. 4, 440 V.
1—30"x60" Jeffrey Vib. 4D, 440 V.
2—60"x16'3" Pioneer-ORD, Apron, 20 HP 440 V.
1—4x8 Jeffrey Vibrating, Type S, 440 V.



36" x 70' Conveyco Mobile Stacker

HOISTS, MINE SHAFT
1—165 HP Denver Engineering, 2 drum, 440 V.
1—100 HP Denver Eng., 1 drum 440 V.
1—150 HP Vulcan-Denver, 1 drum, New
1—600 HP Vulcan Wilkes Barre, 2 drum, 2300 V.
1—675 HP Vulcan Wilkes Barre, 2 drum, 2300 V.
1—50 HP Lidgerwood, 2 drum.

KILN
1—48"x30' Ruggles-Cole Hardinge, gas—oil

LOCOMOTIVES
4—1½ ton Mancha "Little Trammer" 18"-24" ga
1—4 ton Mancha "Electric Mule" 24 ga
1—8 ton Plymouth Diesel, DHD, 24" ga
1—6 ton Mancha "Std AN," Battery, 24" ga

MAGNETS
1—24"x24" Magnetic Pulley 250 V. DC
2—24"x30" Dings Magnetic Perma-Pulley

MILLS
1—7'x48" Hardinge Conical, Lg. Trunnion, 150 HP
1—7'x22" Hardinge Conical, Lg. Trunnion, 75 HP
1—7'x36" Hardinge Conical, Lg. Trunnion, 100 HP
1—7'x5' Allis-Chalmers, grate type, 150 HP
1—5'x10' Marcy, overflow, 100 HP

PUMPS
1—2GT Ing. Rand 50 HP 440 V.
2—1MRVH-7½ Ing. Rand 7½ HP, 440 V.
1—1MRVH-15 Ing. Rand 15 HP 440 V.
2—2MRV-25 Ing. Rand 25 HP 440 V.
2—5RVL-30 Ing. Rand 30 HP 440 V.
2—16" Cascade Sump, 7440 gpm, 30 HP
1—2" Denver Equip. Simplex Diaphram
1—6" Fairbanks Morse, 300 HP Regutron Control
2—14" Yuba, Model AA, 250 HP 5500 gpm
1—10" Yuba, Model S, 2400 gpm
1—16" Wintroath Deepwell, 100 HP Regutron Control
2—8" Dorrco Duplex, Type W, 5 HP
3—6" Dorrco Duplex, VM, 3 HP.
1—3x3 Denver SRL, New.

VACUUM PUMPS
2—18"x6" Ing. Rand ER-1 15 HP 440 V.
1—17"x10" Chicago Pneumatic NISB 25 HP

SAND WHEELS
4—12½'x4' Conveyco Duplex, 20 HP

SCREENS
1—41"x66" Jeffrey-Traylor, F8-2, 1 deck, MG set
1—9' dia x 54½' Yuba, Trommel, 100 HP
3—4'x12' Tyler Tyrock, 1 deck 10 HP
3—6'x14' Hewitt Robins, MH-11, Scalping
2—6'x12' Allis Chalmers, Lowhead
1—4'x8' Tyler Hummer
1—4'x10' Tyler Hummer

SHOVELS
1—20B Bucyrus Erie W/dragline
1—111M Marion Diesel Electric W/3½ yd. Dragline
1—54B Bucyrus Erie Dragline
1—170B Bucyrus Erie, 7 yd. Electric

STACKER MOBILE
1—36"x70' Conveyco, on rail, 180° arc.
1—36"x65' Yuba, on rail, 100 HP.

TRACTORS
1—75A Michigan Loader Waukesha Gas
1—105 Eimco, Angle Dozer, Carco winch
1—TD-14 International, ATECO Dozer.

TRUCK
1—15 ton Mack Off Highway, Model LRX

TRUCK DUMP STATION
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Conveyor Prices Include Belting

Belt Width	Conveyor Length	Sale Price	Add or Deduct Per Foot
14"	25'	$ 766	
14"	50'	1181	$16.62
14"	85'	1763	
16"	20'	700	
16"	45'	1128	
16"	60'	1384	17.10
16"	90'	1897	
16"	150'	2923	
18"	25'	830	
18"	45'	1190	
18"	70'	1641	
18"	85'	1912	18.03
18"	100'	2182	
18"	130'	2723	
18"	200'	3985	
20"	25'	871	
20"	60'	1546	
20"	75'	1836	19.30
20"	90'	2125	
24"	25'	922	
24"	45'	1335	
24"	70'	1852	
24"	100'	2473	20.68
24"	120'	2886	
24"	150'	3507	
24"	200'	4540	
30"	50'	1591	
30"	70'	2054	
30"	90'	2518	23.17
30"	140'	3676	
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36"	60'	2012	24.91
36"	100'	3048	

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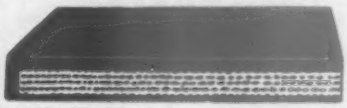

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16"	4	3.21
18"	4	3.56
20"	4	4.11
24"	4	4.61
30"	4	5.84
36"	4	6.69

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18"	4	4.14	3.98
20"	4	4.72	4.54
24"	4	5.35	5.14
30"	4	6.56	6.31
36"	4	7.95	7.64
24"	5	6.25	6.01

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Sauerman 2½ cu yd slackline cableway-excavator
Fuller Kinyon conveying system pump Type E-5-T

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JAW: Reliance, 14x24. Buchanan 18x36, 36x42, Type C 30x42. Cedar Rapids 2036, Traylor 28x36, 36x48, 56x72. Lippman 24x36; Universal 30x42; Superior McCully 42x40.
GYRATORY: Al. Chal. 9. 5K, 10", 16, Gates 12K; Traylor TZ Kennedy Van Saun 37½".
CONE: Symons 3', 4½' 5½', Kue-Ken 36"; Traylor TT4; Telsmith 3', 26".
ROLL: Cedar Rapids 24x16, 55x30; Al. Chal. 37x16, 42x16. Pioneer 40x22, 40x24 triple, 54x24; Telsmith 40x22; Universal 30x18; Lippman 40x20.
MILLS—ROD—Denver 4x8, 4x10, Hardinge 4x10; Marcy 2x5, 5x12.
TUBE: Al. Chal. 6x22, Smidth 5½x20, 6'6"x21; Hardinge 4½x16" 8x18"; 8x9'; 8x36; 8x48; 10x48.
HAMMERMILLS: Penn 8XT-350 HP motor, 6XB 10'x4'7"; Stedman 24x30, 36x42; Cedar Rapids 50-50, 2033, 30x33, 30x42 double; Dixie 36x50.
AUTOGAVES: J&C 6'6"x55" 5' dia., 8 125'
KILNS: 6'x50', 6'x120', 9'x100', 8x124'.
DRYERS: 6'x40, 6x60, 6x72,
BALL MILLS: 4½'x16", 8'x36", 8'x48"

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Universal 4024 roll port. Diesel. New 1958.
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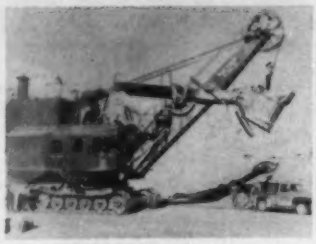

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NOTES FROM THE PUBLISHER

May, 1961

Dear Reader:

In the March issue I wrote to you about the way labor is gouging manufacturers who display their wares at conventions.

We all know that the manufacturer who pays outlandish fees for menial jobs done by labor at these conventions passes these costs on to you, the purchaser. Hence, we all suffer—you, from higher prices; and we, who display our wares, from constantly fighting with the labor at local conventions halls.

The response to my March letter has been overwhelming and, in every case, favorable—favorable in comment that "something must be done."

Let me quote from several of the letters:

"To your comments, all we can add is Amen . . ."

"We would be most interested in supporting whatever contact could be made in the various exhibition cities in which this problem now exists . . ."

"You are to be commended for your 'letter' to readers that appeared in the March issue of ROCK PRODUCTS. It is high time that exhibitors at trade shows unite in their efforts . . ."

"We hope that this will be the beginning of organized investigation into this situation . . ."

"If labor rates and work rules are not established now, the cost of attending this show may become so high as to make it impossible to hold again . . ."

"I think it is about high time we returned to near normalcy in this thing and allow the manufacturer who is exhibiting to have some say-so . . ."

"These reasons are exactly why we did not display at two of the major shows this year . . ."

"It's high time for exhibitors to protest the unfair treatment they are receiving in some of the larger cities . . ."

And on and on and on the letters go.

I am sending copies of this to the mayors of the cities involved with the hope that they, in turn, will cooperate in establishing right and just fees charged by labor at conventions.

If anyone else has any ideas, I should be delighted to hear from one and all.

Sincerely,

Philip D. Allen

Philip D. Allen
Publisher

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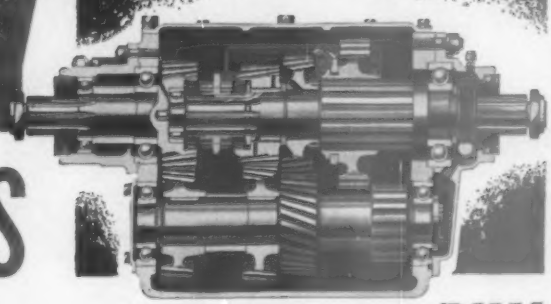

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